The Business Magazine for Makers & Users of Chemicals Management, Research Production, Marketing

CHEMICAL INDUSTRIES

Contents

Volume 48 Number 3

MARCH, 1941

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Plant Operation and Management

New Chemicals for Industry

Chemical Specialties

News of the Month in Review

Part 2: Statistical and Technical Data Section

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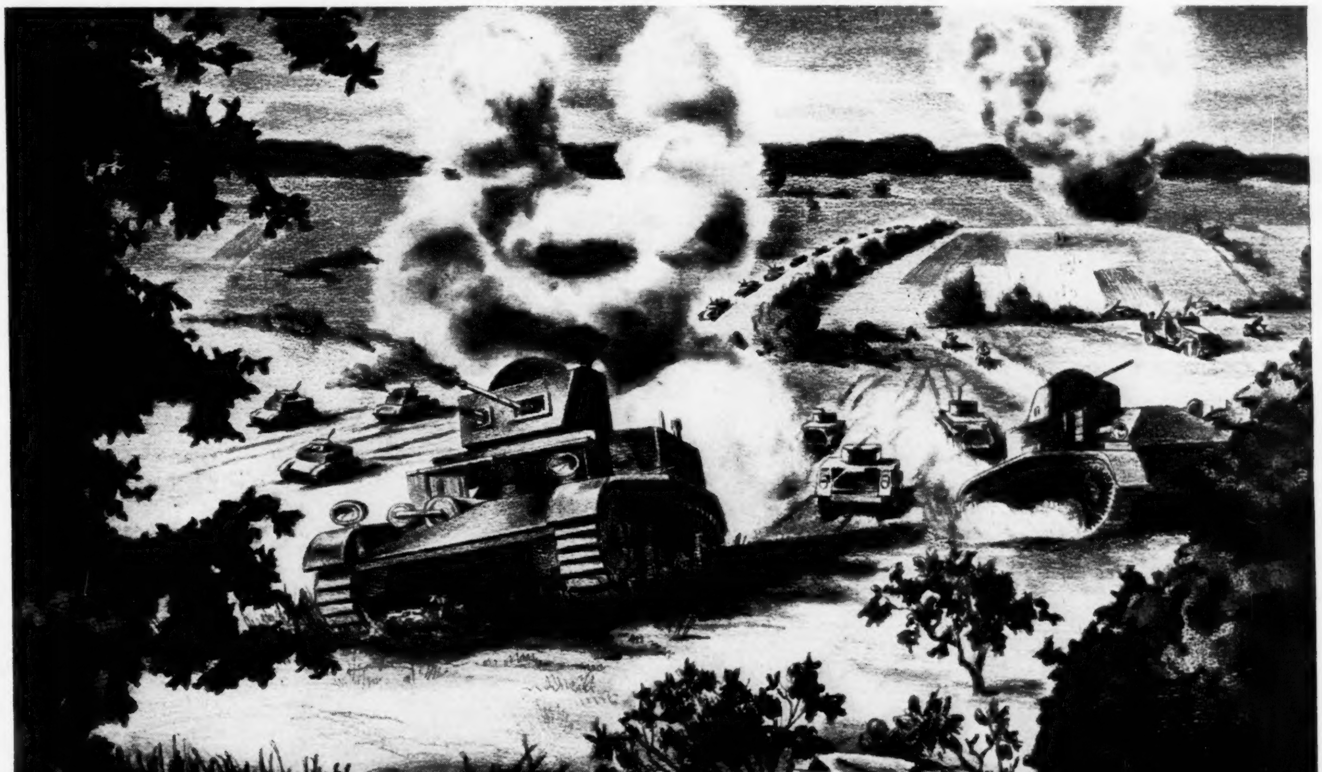
HORSE (power) CAVALRY!

Suppose someone who lived forty or fifty years ago — say one of the founders of Mathieson—could pay us a visit today. And suppose we could show him the sights of 1941—what do you think would interest the old gentleman most? If he were one of the pioneers who founded Mathieson, we believe he would be most interested in the revolutionary changes wrought by chemical progress and in the part his successors have played in building the present-day America. We would go about telling him the story as we tell it in this series of advertisements.

● "Boots and saddles" is pretty much a thing of the past in today's Army, Mr. M.! Instead, it's — "Turn 'em Over!" — and thousands of horsepower spring to life, waiting to move the tanks and trucks and combat cars of today's mechanized cavalry into action. And, of course, the fodder for these thousands of "horses" is high-octane gasoline, product of the great American petroleum industry.

In the refining end of this vast industry Mathieson Chemicals play an important part — caustic soda and soda ash as petroleum treating reagents, bicarbonate of soda for fire-foam systems, anhydrous ammonia for refrigeration and for combatting corrosion in refinery equipment, chlorine and hypochlorite for sweetening distillates. Then, too, the new mechanized "horses" of the Army must have tires, glass, oil and grease, plastic and metal parts, lacquer finishes and lamp filaments. In the manufacture or processing of all of these materials you will find one or more Mathieson Chemicals.

But helping to "keep 'em turning over" is not a new role for Mathieson Chemicals—it's a job they've been doing in the chemical-consuming industries of America for nearly half a century.



MATHIESON CHEMICALS

SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . HTH PRODUCTS . . . AMMONIA, ANHYDROUS and AQUA . . . FUSED ALKALI PRODUCTS . . . SYNTHETIC SALT CAKE . . . DRY ICE . . . CARBONIC GAS . . . SODIUM CHLORITE PRODUCTS

THE MATHIESON ALKALI WORKS (INC.)
60 E. 42ND STREET, NEW YORK, N. Y.

The Reader Writes—

Chemists and the Draft

Congratulations on the editorial in the January issue entitled "A Threat to the Defense Program." I would go a bit farther and emphasize some additional dangers.

1. As things get worse, the individual chemist may become emotional instead of rational and imagine that he can do more for his country carrying a gun than in being the best chemist he can possibly be.
2. Individual employers may forget that we have a Selective Service System and not merely a draft law. They may think that it is not proper for them to ask deferment of their chemists.
3. When deferment is asked but is refused by the Local Board, the chemist and his employer may not realize that it is their duty to appeal to the State Supervisor of the Selective Service Act. A period of five days is allowed for such appeals.
4. Both chemists and their employers may feel that in the case of men who are not working on projects directly connected with the National Defense, it may be proper to allow them to be taken for a year of military training. This is a dangerous idea. We need not only more chemists but *better ones*. We need as good ones as we can possibly have. It should be obvious that an additional year of training or experience will make a chemist more valuable for the National Defense than he would be if his chemical training and experience are interrupted in favor of a year of military training.

Another important point which should be emphasized to all concerned is that chemists and chemical engineers cannot be trained in short periods of time. Consequently, the idea that a deferment of six months or a year will allow time to secure and train an adequate substitute is little less than ridiculous. On the other hand, I doubt the advisability of urging exemption or indefinite deferment.

This is because it is practically certain that it would be very difficult to achieve such results. Moreover, a proper utilization of the six months' deferment plan will achieve all of the values necessary for National Defense. Moreover, such a deferment plan would make possible the shifting of chemists from non-defense activities to more strictly defense activities as affairs become worse. In other words, the whole chemical industry, and perhaps, the whole training machinery for chemists should be regarded as a reservoir in which chemists are being conserved and improved against the undoubted time of need which will come for them in purely defense activities.

FRANK C. WHITMORE,
Dean, School of Chemistry & Physics,
The Pennsylvania State College,
State College, Pa.

"New Chemicals for Industry"

Please accept my thanks and appreciation for your generosity in permitting us to use your display of new chemicals. The exhibit added much to our Open House and was inspected by many hundreds of people.

The literature which you supplied was very popular and was completely exhausted before the evening was gone.

PAUL F. BRUINS,
Assistant Professor,
Dept. of Chemical Engineering,
Brooklyn, N. Y.

The Liquid Bleach Article

May we take the liberty of correcting a statement made in reference to the use of glass cooling units in Mr. Benjamin Levitt's article on Liquid Bleach in the January issue? He mentioned rubber-covered "Pyrex" Brand glass coils for controlling the temperature of the reaction vat. It is unnecessary to protect the glass with any coating, as our chemical resisting tubing and piping will resist the action of the hypochlorite almost indefinitely. We believe that he may have been misled on this point for we manufacture glass cooling candles equipped with metal heads, and these heads are sometimes coated with a varnish or rubber base paint to protect them.

Ordinarily, we discourage the use of large glass coils for reasons of economy and the problems of installation. Smaller units like candles are just as satisfactory and considerably cheaper. They have longer service life, the maintenance is lower, and replacement is quicker if accidental breakage occurs. A series of glass candles suspended from suitable framework over the reaction bath and extending to the bottom of the tank can be connected to a circulating cooling brine system. The same brine may be used that is employed for pre-cooling the caustic soda. We know of one plant that precools their caustic and then uses a portion of this to circulate through the candles in the reaction bath.

C. RUTLEDGE, JR.,
Industrial Division,
Corning Glass Works,
Corning, N. Y.

EDITORIAL NOTE: *This page is an open forum for the readers of* CHEMICAL INDUSTRIES. *All correspondence must be signed but names will be withheld if so desired.*

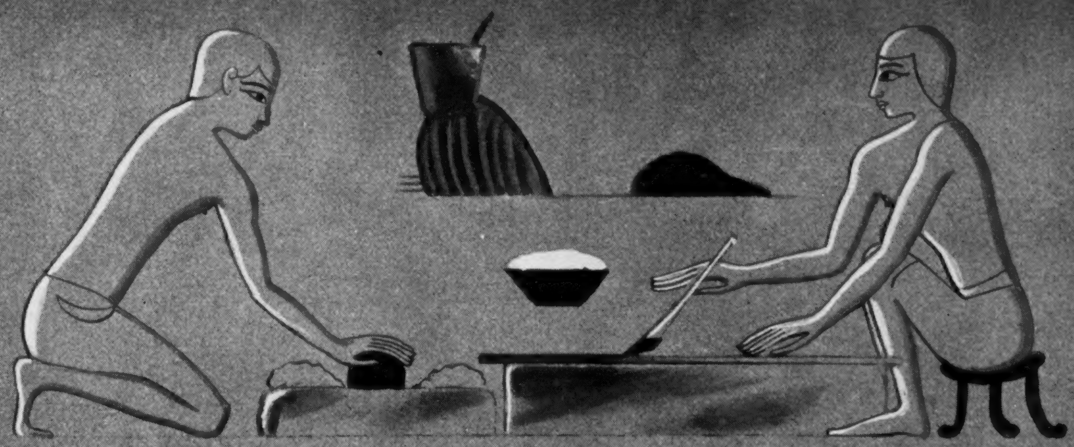
CALENDAR OF EVENTS

March

Mar. 11-13, Indiana Independent Petroleum Assn. Spring Convention and Refiners' and Suppliers' Exhibit, Hotel Severin, Indianapolis, Ind.
Mar. 13, 16th Annual Drug, Chemical and Allied Trades Banquet, Waldorf-Astoria Hotel, New York City.
Mar. 13, New Jersey Oil Trade Assn. Annual Spring Frolic, Robert Treat Hotel, Newark, N. J.
Mar. 13-14, American Gas Assn., Industrial Gas Sales Conference, Baltimore, Md.
Mar. 13-14, Society of Automotive Engineers, National Aeronautic Meeting, Washington Hotel, Washington, D. C.
Mar. 17-22, Oil Burner Institute's National Oil Burner Progress Exhibition, Commercial Museum, Philadelphia, Pa.
Mar. 20, Louisville Paint & Varnish Production Club, Brown Hotel, Louisville, Ky.
Mar. 20, New England Paint & Varnish Production Club, Regular Monthly Meeting, Hotel Vendome, Boston, Mass.
Mar. 20-21, American Water Works Assn., New York Section Meeting, Syracuse, N. Y.
Mar. 20-21, New Jersey Sewage Works Assn., Annual Meeting, Stacy-Trent, Trenton, N. J.
Mar. 21, Akron Rubber Group, Dinner & Meeting, Akron City Club, Akron, O.
Mar. 21, Milwaukee Paint, Varnish & Lacquer Assn. Regular Meeting, Milwaukee Athletic Club.
Mar. 25, Oil Trades Assn. of New York, Inc., Banquet—Election of Officers, Waldorf-Astoria Hotel, New York City.
Mar. 31-Apr. 1, Tanners' Council of America, Leather Show, Waldorf-Astoria Hotel, New York City.
Mar. 30-Apr. 5, The American Ceramic Society, 43rd Annual Meeting, Lord Baltimore Hotel, Baltimore, Md.

April

Apr. 1, Packaging Institute, Semi-Annual Meeting, Stevens Hotel, Chicago, Ill.
Apr. 1-3, The American Society of Mechanical Engineers, Spring Meeting, Atlanta, Ga.
Apr. 1-4, American Management Assn. (Packaging Conference & Exposition), Stevens Hotel, Chicago, Ill.
Apr. 2, American Institute of Consulting Engineers, Luncheon Meeting, City Midday Club, New York City.
Apr. 2-4, American Association of Petroleum Geologists, 26th Annual Meeting, Rico Hotel, Houston, Texas.
Apr. 3, Indianapolis Paint, Varnish & Lacquer Assn., Columbia Club, Indianapolis, Ind.
Apr. 7-11, American Chemical Society, Semi-Annual Meeting, St. Louis, Mo.
Apr. 9-10, Midwest Power Conference, Palmer House, Chicago, Ill.
Apr. 16-18, Western Petroleum Refiners Assn., Arlington Hotel, Hot Springs, Ark.
Apr. 16-19, The Electrochemical Society, Inc., Semi-Annual Convention, Cleveland, O.
Apr. 17, Louisville Paint & Varnish Production Club, Brown Hotel, Louisville, Ky.
Apr. 17, New England Paint & Varnish Production Club, Regular Monthly Meeting, Hotel Vendome, Boston, Mass.
Apr. 17-18, American Petroleum Institute, Division of Production, Wm. Penn Hotel, Pittsburgh, Pa.
Apr. 18, Society of Chemical Industry, Joint Meeting with American Chemical Society, New York Section.
Apr. 21-23, American Gas Assn., Distribution Conference, Pittsburgh, Pa.
Apr. 21-23, National Sanitary Supply Assn., Annual Convention, St. Louis, Mo.
Apr. 21-24, 37th Annual Knitting Arts Exhibition, Commercial Museum, Philadelphia, Pa.



PIGMENTS IN ANCIENT EGYPT

IT is well established that early Egyptians were skilled in many of the common arts, and from the above illustration appearing on the walls of the pyramids, we know that the art of paint making was practiced in ancient Egypt. There is no record, however, that Chromium or its pigments were known earlier than the end of the eighteenth century when the element Chromium was first isolated.

Like a number of important inventions and discoveries made at about the same time, Chromium contributed importantly to the rapid developments of science and industry during the ensuing 150 years. Today Chromium pigments provide The World of Color with fast, fiery reds, mellow oranges, brilliant yellows, and the most permanent greens known.

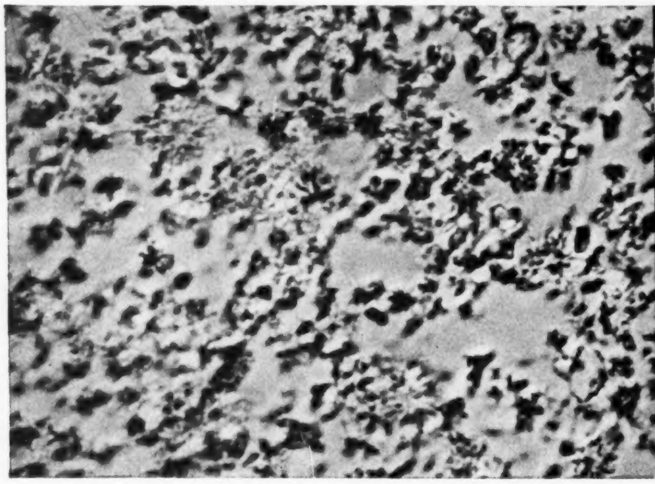
The Mutual Chemical Company of America, as the largest manufacturer of Bichromate of Soda and Potash, has been intimately associated with the entire development of Chromium pigments for more than a century.

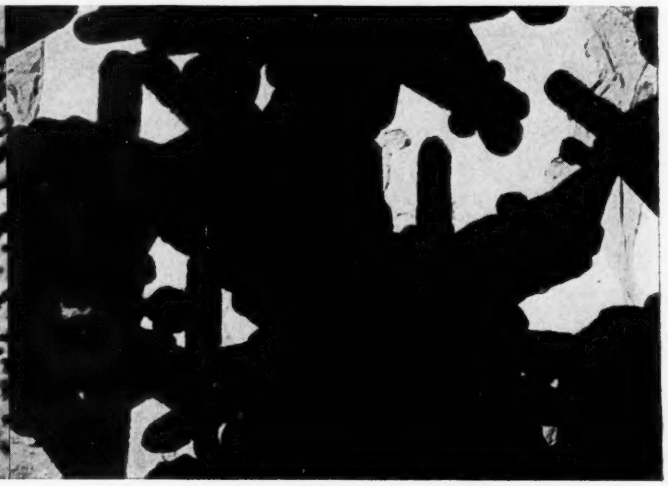
MUTUAL CHEMICAL CO. OF AMERICA NEW YORK N.Y.

Mutual Chemical Co. of America

270 MADISON AVENUE, NEW YORK

LIFE on the

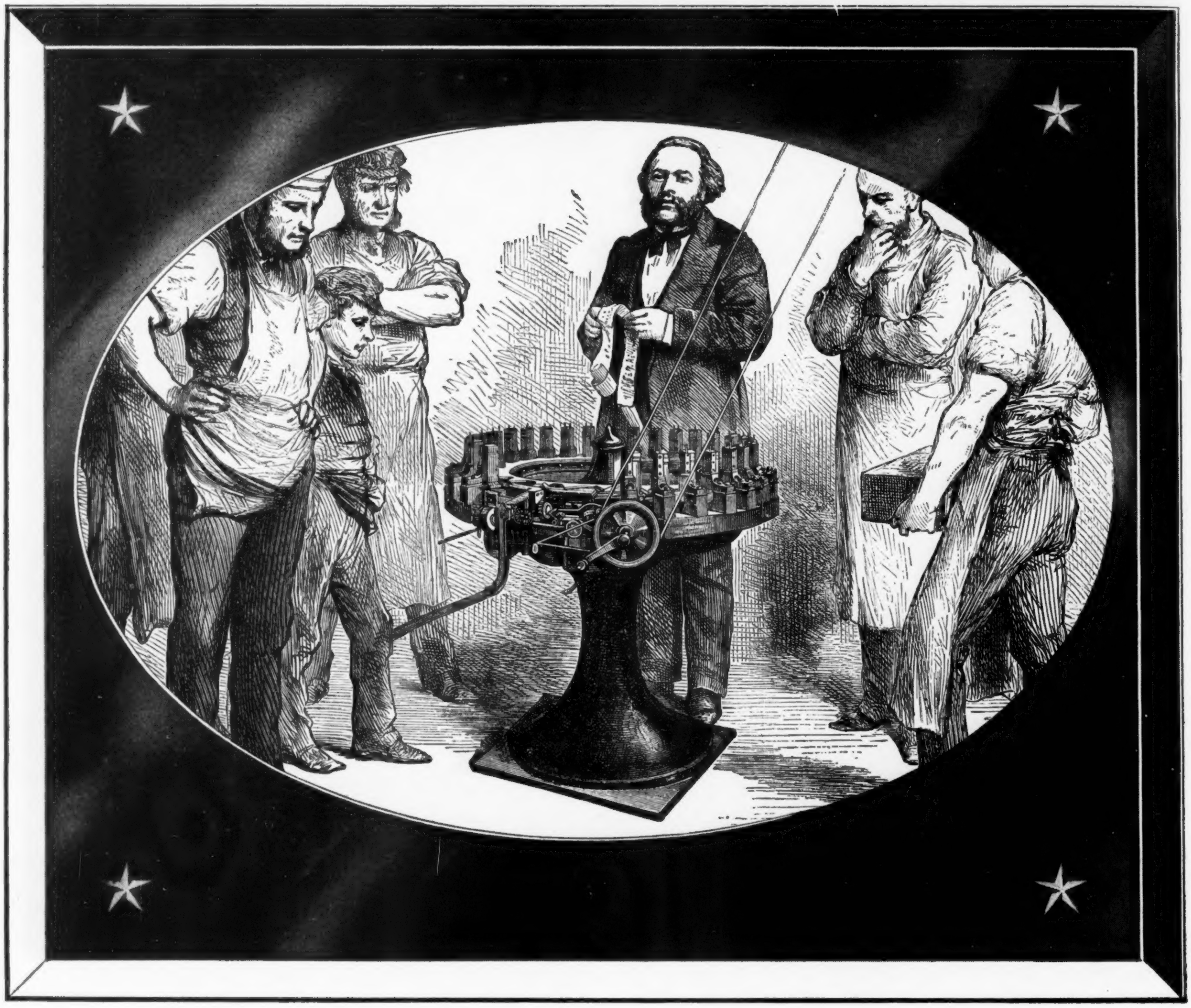




(*Above*) **BOUNDARIES OF KNOWLEDGE** are being pushed back by the electron microscope, which permits useful enlargements far beyond the practical range of optical instruments. Comparative potentialities of the two types are illustrated by these two photomicrographs of calcium carbonate. Photo at left was taken with an optical microscope, enlargement 1,500X. (Upper limit of useful magnification with the optical microscope is about 2,000X.) Total enlargement in the photo at right is 36,000X. This photomicrograph was first taken at an enlargement of 12,000X with the electron microscope at Cyanamid's Stamford Laboratories, and then enlarged to its present magnification.

(*Below*) **EASTER LILIES** are now being grown from domestic bulbs, with results that are said to compare favorably with those obtained from imported bulbs. A valuable aid in commercial greenhouse plant cultivation is Cyanamid's CYANOGAS† G-FUMIGANT—an economical, effective method of greenhouse insect control.

(*Above*) **DISINFECTING BANANAS** is an unusual application for muriatic acid. At this Central American plantation, the bananas are dipped in the acid and are then thoroughly washed in clear water to remove the acid. In addition to the many types of special chemicals that are included in Cyanamid's line, Cyanamid is a major producer of heavy chemicals for a broad range of basical industrial applications, supplying acids and alkalis to the metal, oil refining, paper, textile, rubber, and many other industries. To each of these industries Cyanamid also supplies a long list of chemicals that have been developed by Cyanamid's research organization to meet specific problems, to effect production economies, or to improve product quality. Cyanamid offers technical assistance in the use of these special chemicals.



They Started Something!

THE DEVELOPMENT of the first power-operated machines for setting type marked one of the greatest advances in the art of printing since the days of Gutenberg. Foreshadowing the giant linotypes of today, the typesetting machine enormously simplified the task of preparing material for publication, and made possible great savings in printing time and cost. The benefits to the public were of major importance—faster dissemination of information, lowered costs that made the printed word available to greatly increased numbers of people. And the resulting increase in the demand for newspapers, magazines, and books opened wider markets for the manufacturers of the materials and equipment needed by the printing industry.

When EBG engineers first made Liquid Chlorine commercially available in America, their work also benefited both industry and the public. EBG Liquid Chlorine gave municipalities a new and effective means of safeguarding the public from the dangers of water-borne diseases—and today is constantly expanding its usefulness in the newer field of sewage sterilization for controlling and abating the pollution of rivers and harbors. And in the paper

The first cylinder of Liquid Chlorine made by EBG in 1909.

and textile industries, EBG Liquid Chlorine made possible new standards of bleaching efficiency and economy. First to produce Liquid Chlorine commercially, EBG engineers have the advantages of *extra* years of experience in its manufacture and servicing. This added experience works to *your* advantage when you specify EBG Liquid Chlorine.

ELECTRO BLEACHING GAS COMPANY
Main Office: 60 East 42nd Street, New York, N.Y.
Plant: Niagara Falls, N.Y.

EBG Liquid Chlorine
FIRST IN THE COUNTRY

CHEMICAL INDUSTRIES
The Chemical Business Magazine
Established 1914

Plastics as "Ersatz" Materials

THE plastics field is experiencing terrific impetus from the current drive to develop substitutes for aluminum, nickel, zinc, magnesium and tungsten in the production of non-defense and consumer goods. While unquestionably some unnecessary hysteria exists concerning the supposed non-availability of adequate stocks of these and other essential and vital materials, there are good reasons for assuming that unless sensible precautions are taken now serious consequences may arise within the next year or two.

There is, therefore, every justification for the present intensive efforts very much in evidence not only in the laboratories of the plastics manufacturers themselves, but also in the research organizations of many of the large corporations producing consumer goods. Several prominent independent consulting firms likewise report sudden interest on the part of many of their clients, both large and small, in plastics as substitutes for various metals and alloys.

The automotive industry is seriously handicapped in its efforts to find satisfactory substitutes for certain parts because it cannot redesign now but must fit such substitutes into present designs. In a somewhat more limited degree the same situation is true of the refrigerator and washing machine manufacturers. While substitutions in these two fields and in cooking utensils will be most spectacular, at least to the layman, it should be borne in mind that practically all manufacturing operations will be more or less influenced by shortages and that plastics, while attracting the most attention and publicity, are by no means the only substitutes readily or potentially available. The really wise manufacturer (no matter what he produces) has determined what the items are that he now uses that may become scarce and higher in price or entirely unavailable and has investigated along with plastics and synthetic coatings such materials as hard rubber, soft rubber, the new synthetic rubbers, glass, ceramics, and new alloys, etc.

Most certainly the plastics industry (now largely a division of the chemical industry) is to be congratulated on the opportunity now present to not only serve the country, but to lay the groundwork for an era of great expansion and prosperity. But a word of caution is not entirely out of order at this point. The history of the so-called "synthetics," from the introduction of Perkin's dye down to "Buna" and "Butyl" rubbers, clearly indicates that only after the idea of substitution for a natural material has been thoroughly discredited and discarded as the main motivating influence does real progress and substantial growth really follow.

Did not many of the pioneers in plastics believe that the glass tableware industry was doomed? Was not rayon to replace silk? Were not the original researchers in synthetic rubber seeking a material to make tires out of? Were not "wetting agents" to eliminate most of the uses of soap?

It is not likely that aluminum, magnesium, zinc and other metals and alloys will be permanently replaced by plastics and other substitutes in many of the uses where because of the emergency substitution has now or is likely to become necessary in the near future. In what we hope is not the too distant future industry will return to normalcy. Each and every material, natural and synthetic, will be forced, as Dr. Harrison E. Howe, recently aptly phrased it, "to make its own way on price and service."

Editorial

Technicians and the Draft: This publication has stressed on several occasions in the past six months or so obvious shortcomings in the operation of the Selective Draft Act. In that period the editors have received an extraordinarily large number of letters from readers and most of these have been complimentary. Yet in the interest of fair-play we must report that a few of our readers have accused us of stirring up a hornets' nest. Others have intimated strongly that we were anticipating trouble and lacked specific examples of actual cases where industry was experiencing difficulties.

To all our readers and particularly those who have felt that we have been unduly alarmed we suggest careful reading of the article "Chemical Labor and the Operation of the Draft Act," written by Albert J. Gerathy, Superintendent of Chemical Manufacturing for the Schering Corporation.

It is important to point out that Mr. Gerathy's article was not originally prepared for publication but was a confidential report undertaken to acquaint the management of the Schering Corporation with the actual situation in the company's plant at Bloomfield, New Jersey. One of the editors of CHEMICAL INDUSTRIES was permitted to read this report and immediately sought permission to publish it.

We wish to publicly thank the management of the Schering Corporation for their permission to bring this case-history to the attention of the whole industry. Mr. Gerathy has no axe to grind. His criticisms are purely objective and made solely in the interest of obtaining a closer and better state of cooperation and understanding between officials of local draft boards and company officials who must keep the wheels of industry humming at top speed during the national emergency.

Reporting the Markets: Readers of CHEMICAL INDUSTRIES will notice when they reach the news and markets pages of this issue that several changes have been introduced. The policy of reporting the markets in certain more or less stereotype groups or divisions, such as "Industrial Chemicals," "Coal-Tar Chemicals," "Solvents," etc., has been discarded in favor of a brief, authoritative, running, yet all inclusive market comment.

Actually through the elimination of such department headings the Market Editor will have more space at his disposal to report what has taken place in the chemical and raw material marts and what is of still greater importance, what is likely to take place in the future. Still greater effort will be made to supply "C. I." readers with a wider background that will assist materially in interpreting more accurately price changes and market trends. Beginning with the April issue your new Market Editor, Paul B. Slawter, Jr., will select one product of special timely interest for special review.

The new arrangement of layout will permit the editors to departmentalize the news to a much greater extent than heretofore and to bring it so to speak—"all under one roof." These changes have been made to improve our service and to still further conserve our readers' time. Do let us know whether you like it or not.

Cooperate in Army Day Plans: April 5th has been selected as the date for Army Day Celebrations throughout the country. A mammoth military parade will be held in New York City and industry has been invited specially to participate in this demonstration of solidarity and to attend the banquet in the evening at the Waldorf-Astoria at which William S. Knudsen, defense production chief of the Office of Production Management, will be the principal speaker.

There are certain elements in Washington who appear to be determined for one or more reasons to misinterpret the actions and policies of business and industry. Unless we are grossly misinformed the lay public is going to be told shortly by some of our officials that industry is not cooperating—indeed, already we have had specific examples of such smear tactics in two divisions of the chemical industry.

We must see that the record is kept straight. Industry has responded magnificently and should not remain silent in face of such baseless insinuations. Let industrial leaders, labor and the military join in a demonstration of cooperation on April 5th that will leave no doubt as to where this country stands in its determination to maintain the "Democratic way of life" at all costs.

Calco's Effluent Treatment Plant: One of the most difficult industrial waste treatment problems in this country has been solved by engineering and chemical skill of high order, patience and intelligent cooperation between industrial management and state health officials.

The Raritan River flows through a rather densely populated area. Few plants of the size of the Calco Chemical Division of Cyanamid are located in such a region; few plants must deal with effluent containing waste liquors from over 600 different products, including dyestuffs, intermediates, acids, alkalies, solvents, rubber accelerators, antioxidants and pharmaceuticals.

Actually the engineers of the company working on this problem were unable to find any other plant in either this country or in Europe where the problem was sufficiently similar so as to provide a guide for a satisfactory solution. What has been accomplished at Bound Brook has been done in the face of the most discouraging conditions.

With great ingenuity, we are almost tempted to say with great diabolical ingenuity, Calco engineers have set one waste against another, systematically destroying one after the other until the effluent as it is finally discharged is harmless. We gladly leave the details of the treatment to the capable authors of "Calco Solves the Raritan River Pollution Problem." Whether you are technically trained or not, you will thoroughly enjoy this splendidly written article and CHEMICAL INDUSTRIES feels highly honored to be able to publish it at this time.

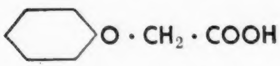
To all those who have cooperated in this outstanding achievement, CHEMICAL INDUSTRIES extends heartiest congratulations—the far-sighted officials of the Calco Division of Cyanamid, the chemists and engineers of the company, and the New Jersey State Department of Health.

DOW

15A

SPECIAL PRODUCTS

PHENOXYACETIC ACID



Properties:

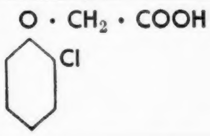
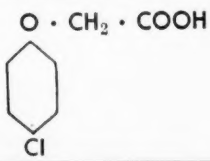
White to pale straw-colored crystals. Melting point..................99-101° C.

Solubility:

(in g./100 g. of solvent)

Alcohol at 25° C.............Very soluble
Benzene at 25° C......................3
Carbon Tetrachloride at 25° C...Insoluble
Ether at 25° C........................29
Water at 25° C.........................1
Water at 80° C............Very soluble

Also available in experimental quantities

PRODUCT	FORMULA	PROPERTIES	SOLUBILITY at 25° C. in g./100 g. of solvent
o-CHLOROPHENOXY-ACETIC ACID		White to pale straw-colored crystals Melting point......146-148.5° C.	Alcohol......................21 Benzene...............Insoluble Carbon Tetrachloride...Insoluble Ether...................... 9 Water....................<0.3
p-CHLOROPHENOXY-ACETIC ACID		Fine, white to pale straw-colored crystals Melting point.......157-158° C.	Acetone.....................31 Benzene...............Insoluble Carbon Tetrachloride...Insoluble Ether........................12 Methanol...................33 Water.................Insoluble

DOW

CHEMICALS INDISPENSABLE TO INDUSTRY *include:* PHENOLS CAUSTIC SODA • ANILINE OIL • ORGANIC SOLVENTS • EPSOM SALT • SODIUM SULPHIDE • DOWTHERM

A complete catalog of Dow Industrial Chemicals will be furnished upon request.

THE DOW CHEMICAL COMPANY, MIDLAND, MICH.

Branch Sales Offices: New York City · St. Louis · Chicago · San Francisco Los Angeles · Seattle

CALCO SOLVES

Raritan River Pollution Problem

By: V. L. King
C. E. Mensing
C. H. Bean
R. L. Cassell
H. C. Spencer

BEFORE the Calco Chemical Division of American Cyanamid Company began operations in 1915 at Bound Brook, N. J., the Raritan River was the sewer of both manufacturing plants and municipalities. During the World War period, there was little thought or attention given to the pollution of the river, but with peace and the return to normal living and working conditions, the growing problem of river pollution was increasingly recognized.

The most important developments in this company's pollution prevention program in this period were first, the construction of a comprehensive sewage and drainage system throughout the plant and second, a systematic planning of buildings and regrouping of manufacturing operations. The manufacturing operations having similar effluents were, insofar as practical, located together. This grouping of products and the system of connecting enclosed sewers has been helpful both in studying and disposing of the effluents.

As the needs arose, sludge basins were built to collect iron oxide sludges from waste liquors of reduction operations, chrome sludges, and various other sludges which might form banks along the Rari-

tan River. Spent acids were purified and reconcentrated for use again. Efforts were made to trap all oil sleeks inside the shops or at the outlet of the shop sewers to the main sewer line. Small amounts of finely suspended material have been prevented from reaching the effluent by tailings presses and settling tubs. Though all of these undertakings helped to reduce the river pollution, the remaining effluent from the plant was still colored and also acid.

This 10 to 15 million gallons per day of effluent contained waste liquors from over 600 different products, including dyestuffs, intermediates, acids, alkalies, solvents, rubber accelerators, antioxidants and pharmaceuticals. The 1937 survey of the Department of Health, with data on pH, total solids, color, dissolved oxygen content, biochemical oxygen demand, oxygen-consuming power, and B-coli content, showed the extent of pollution of the Calco waste in the river at that time.

How Calco engineers cooperating with New Jersey State Department of Health solved an effluent problem that was becoming more serious year by year is a story of patience, engineering efficiency and the expenditure of some $500,000. The experience gained in solving this waste diposal problem will serve as a guide and inspiration to engineers now working on stream pollution elimination.

We undertook to develop a treatment process that would so improve our effluent that:

a. All free titratable acidity in the effluent would be neutralized to the erythrosine indicator end point, 4.0 + pH.

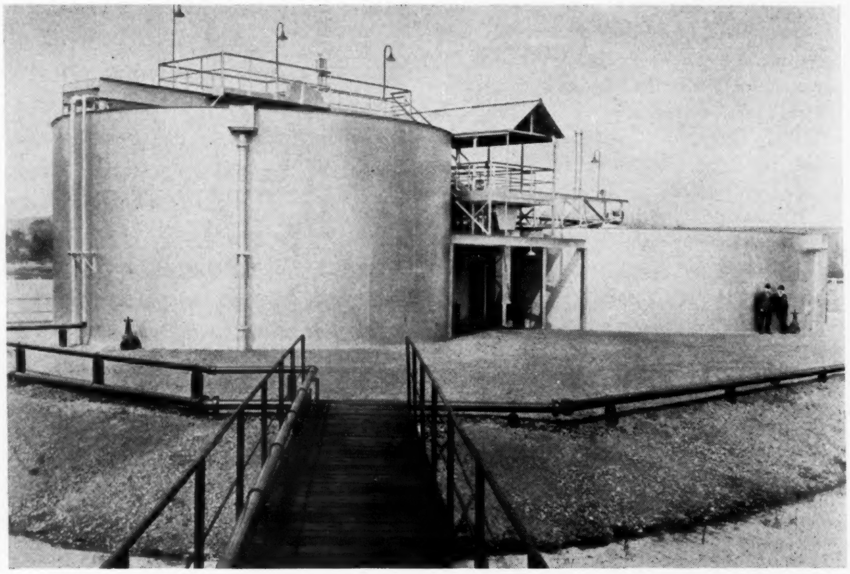
b. The effluent does not reduce the dissolved oxygen content in the river below 50 per cent. of saturation.

Left, an airplane view of the plant of the Calco Chemical Division of the American Cyanamid Company at Bound Brook, N. J. The plant itself is top center, a little to the right. Follow the railroad to the effluent plant and you can see the tanks, lagoons, and on the bottom of the picture, the Raritan River. Below, a closeup of a photograph looking across one of the thickening tanks.

c. The effluent will not substantially discolor the river, add to the turbidity, produce oil sleeks or scum, or form sludge banks in the river bed.

Neither in this country nor in Europe were we able to find a manufacturer of similar products who had undertaken treatment of the effluents either on the scale or to the extent contemplated here. The many engineering concerns in this country who were consulted, not having had the opportunity of treating such effluents, were unable to present any plans that promised results which would meet the desires of both ourselves and our State Department of Health. This industrial waste is of such a complex character that no methods of treatment were known to anybody. Therefore, it soon became apparent that we would have to develop a treatment process as best we could here at the plant.

In order to keep the cost of operation from being prohibitive it was obvious at the start that the use of chemicals even in a modest way would result in extremely high material costs. Every effort was therefore made to develop a process in which the various wastes were made to destroy one another as much as possible. This was accomplished by compositing all of the available waste products. It was necessary to establish that the diversity of manufacture of products and therefore of production of wastes had reached a point where by thorough compositing sufficient mutual destruction could be accomplished.



Above, the Dorr slurry mixer (left) and the Dorr classifier (right) make use of waste calcium carbonate from an adjoining magnesia plant to treat Calco's own organic and dry color wastes. Plant above treats at the rate of 15 million gallons a day discharging a clear harmless liquid into the Raritan River.

Pilot Plant Established

To establish this a pilot plant was built large enough to composite a 40,000-gallon sample of each of the various wastes produced in one day. The pilot plant was built in May 1938, at a cost of about $20,000, and operated on a 40,000-gallon-per-day basis for a year. During the year's operation of the pilot plant it was established not only that in 24 hours there were enough different kinds of waste to mutually destroy one another, but also that each day there were enough. This was in spite of a fluctuating schedule of manufacture. The extent of the mutual self destruction was also very nearly the same all the time. To prove that this mutual self destruction would take place in all seasons was the reason that the pilot plant was operated for a year. At the same time we were able to confirm that even after compositing at all times during the year there would be sufficient acid to destroy all the sewage as determined by the B-coli content.

The plant, embodying the process developed in the pilot plant, was built in 1939-1940 at a further cost of about $300,000. Following is a general description of the steps in the process with the approximate costs of construction of the equipment.

The costs of building each individual basin at the treatment plant are not available. However, clearing the 35 acres of the site from trees cost 1 per cent. of the total. Stripping the top-soil, digging the basins, and building the dikes around all the basins accounted for 15.5 per cent. of the total cost.

1. Special pre-treatment at the source is used to destroy individual effluents which are particularly troublesome because of color, acidity, reducing action, etc., before the wastes are admitted to the effluent plant.

2. The entire waste from the plant, as is or pre-treated, drains through a system of tile sewers to a central collecting sump of 350,000 gallons capacity. The pumping station adjacent to this collecting sump has four pumps of special alloy bronze (total maximum capacity of 15,000 G.P.M.) to pump the untreated waste from the sump to the treatment plant. Construction costs of the sewer extensions, collecting sump, and pumping station were 17 per cent. of the cost of the treatment plant. The four pumps discharge into a 36-inch wooden pipe line which carries the waste 3/5 of a mile to the compositing basin at the treatment plant. Approximately 15 per cent. of the total cost was expended on this pipe line.

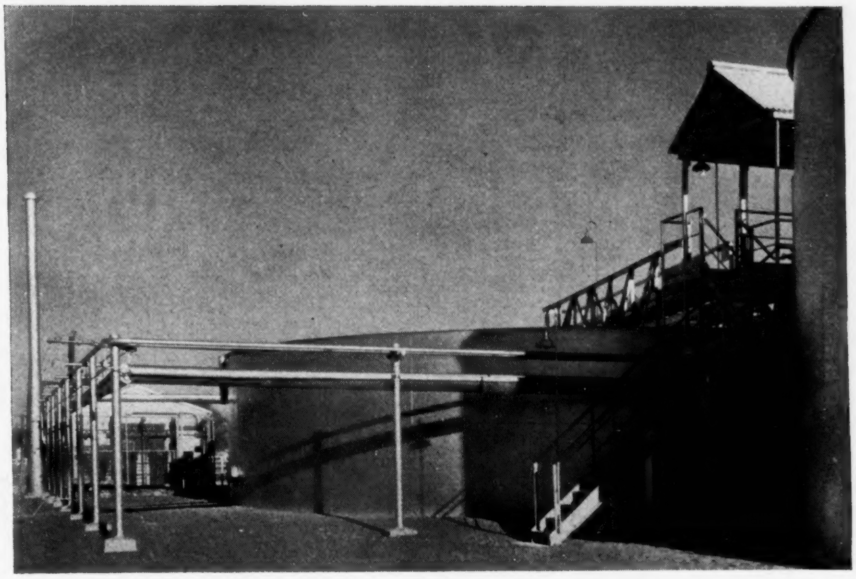
3. The compositing of all the raw wastes discharged from the plant over a 24-hour period is the most important step in the treatment process. The effluent plant compositing basin is an earthen-diked pond of 10,000,000 gallons capacity. Here all the wastes are forced to react in a multitude of ways, destroying the bulk of the color, and producing a uniform, amber-colored composited waste. The strongly acid nature of the wastes is used to destroy all the sanitary sewage from the plant.

4. A skimming board ahead of the neutralizer removes any remaining oil, scum or other floating material from the effluent not already caught at the source so as to expose a clean surface to the action of the sun and air in the settling lagoon. The material removed by the skimmer enters an oil separator which separates the floating material from the water layer. The oil is removed and burned. This unit cost ½ per cent. of the total.

5. The uniform composited waste after passing under the oil skimmer is neutralized with an alkaline calcium carbonate slurry in a highly agitated area. The residual acidity of the effluent is adjusted, an automatic pH controller regulating the addition of the carbonate slurry to keep the pH of the treated effluent constant. Approximately 9 per cent. of the total cost is represented by the neutralizer equipment, control house, and power line. The pH controller equipment amounted to ½ per cent. of the cost.

Johns-Manville Corporation, Manville, N. J., supplies the tons of calcium carbonate for the neutralization of the acid Calco waste. The carbonate has long been a waste product for Manville, hence its utilization as a neutralizing agent has been beneficial to both companies.

The carbonate as a slurry is pumped through a mile of 6-inch iron pipe from Manville to the slurry tank at the Calco treatment plant. The slurry is then thickened from 10 per cent. solids to 20 per cent. solids so that more can be stored in the mechanical handling equipment. If the slurry tank and thickener are full, the slurry is pumped to a storage basin of



Above, a closeup of one of the thickening tanks at Calco. Slurry from the classifier (which stores waste calcium carbonate for degritting) is thickened to a heavy sludge in this tank. Raw dye wastes from a lagoon are mixed with the lime sludge, given a short conditioning in a flocculator and then clarified in a second lagoon.

10,000,000 gallons capacity from which it can be hydraulically mined when necessary. This insures a constant supply of neutralizing agent should the Manville supply be temporarily unavailable.

The Manville pumping station and pipe line cost was 7 per cent. of the total. Johns-Manville furnishes the power for this unit at a nominal charge.

The Dorr Company supplied the slurry mixer, classifier, and thickener. This equipment, plus a slurry tank and pump and high pressure water pump for hydraulically mining the settled carbonate from the storage basin amounted to 12 per cent. of the total cost.

6. The neutralized effluent is distributed through an inlet flume uniformly across the south side of the earthen-diked settling lagoon of 60,000,000 gallons capacity. The homogenizing begun in the compositing basin is completed here, and the large surface—23 acres—is exposed to the bleaching influence of the sun and air without the blanketing effect of any surface oil or scum. From five to six days detention period in this lagoon settles the remaining suspended material to give a very clear effluent. On the opposite side of the lagoon is another wooden flume which carries the final treated effluent from the settling lagoon to an open canal.

7. Throughout the mile long canal the effluent receives further bleaching and aeration as it flows over two dams toward the entry point into the Raritan River. The flumes and canal represent about 12.5 per cent. of the total cost of the treatment plant.

Effluent Enters Sump

At the river bank below the intake station of the Calco water system, the treated effluent enters a concrete sump which feeds a tile pipe inside of the concrete diffusion dam. This pipe has multiple outlets across the downstream side of the dam. The entering waste is diffused at once into the full flow of the river through the discharge ports. Aeration is intense as the river flows over the dam, and so mixes the effluent that the full effects of the dilution with the river are had promptly. Approximately 9 per cent of the total cost was expended on the diffusion dam and its appurtenances.

Company's Engineering Departments Cooperated With Board of Health

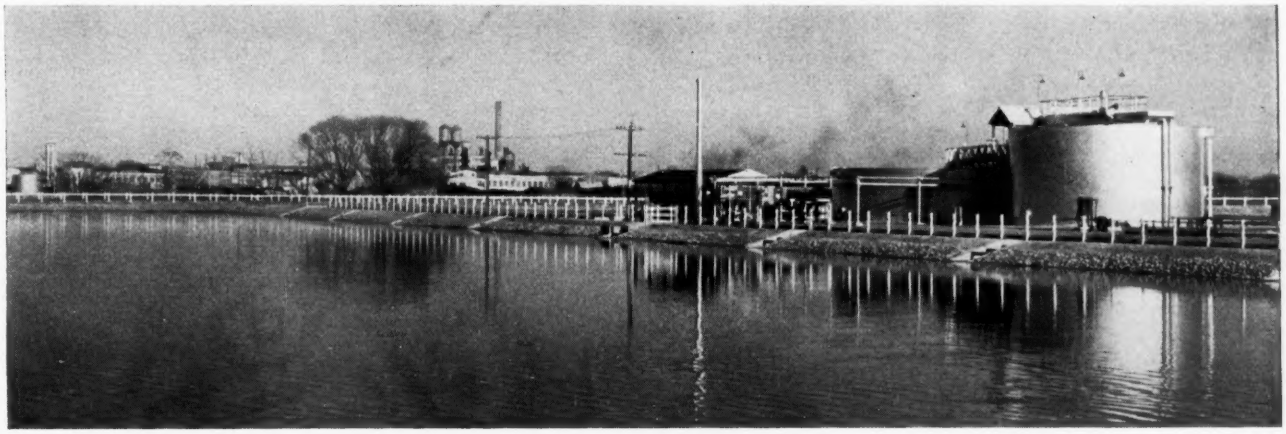
Our treatment process as developed and our plans as engineered by the company's technical and engineering departments were submitted to and approved by the Department of Health of New Jersey before any construction work was done. At the suggestion of the State Department of Health engineers, we installed the diffusion dam first and put our untreated effluent into it in Sept., 1938 to get some improvement in the river promptly while we were engaged in developing our treatment process. Altogether, about $500,000 has been expended on the whole project.

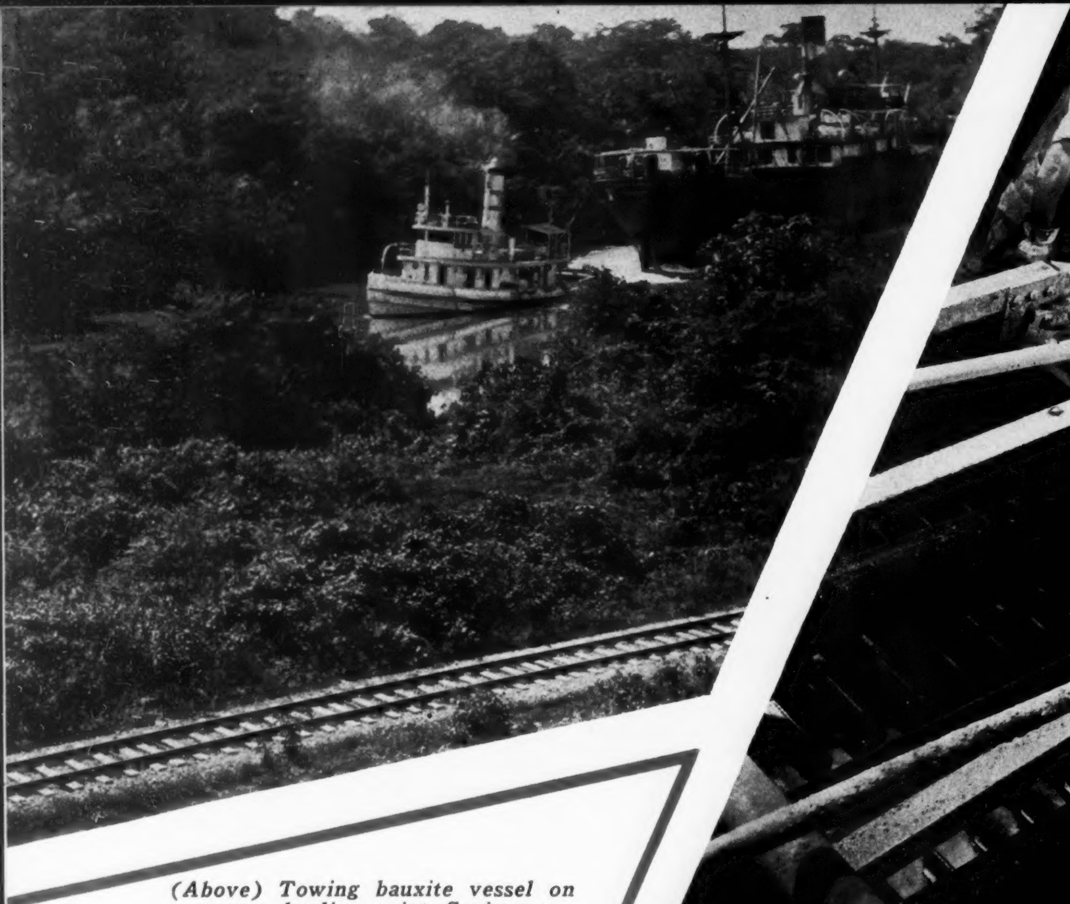
The treatment process and plant is operated under the supervision of a chemical engineer licensed by the State Department of Health, a superintendent, four shift operators and one day operator to run the pumping station at Johns-Manville. This department maintains a daily system of inspections of sludge basins, oil traps and individual effluent pre-treatment processes at the various sources to keep excessive pollution from reaching the treatment plant.

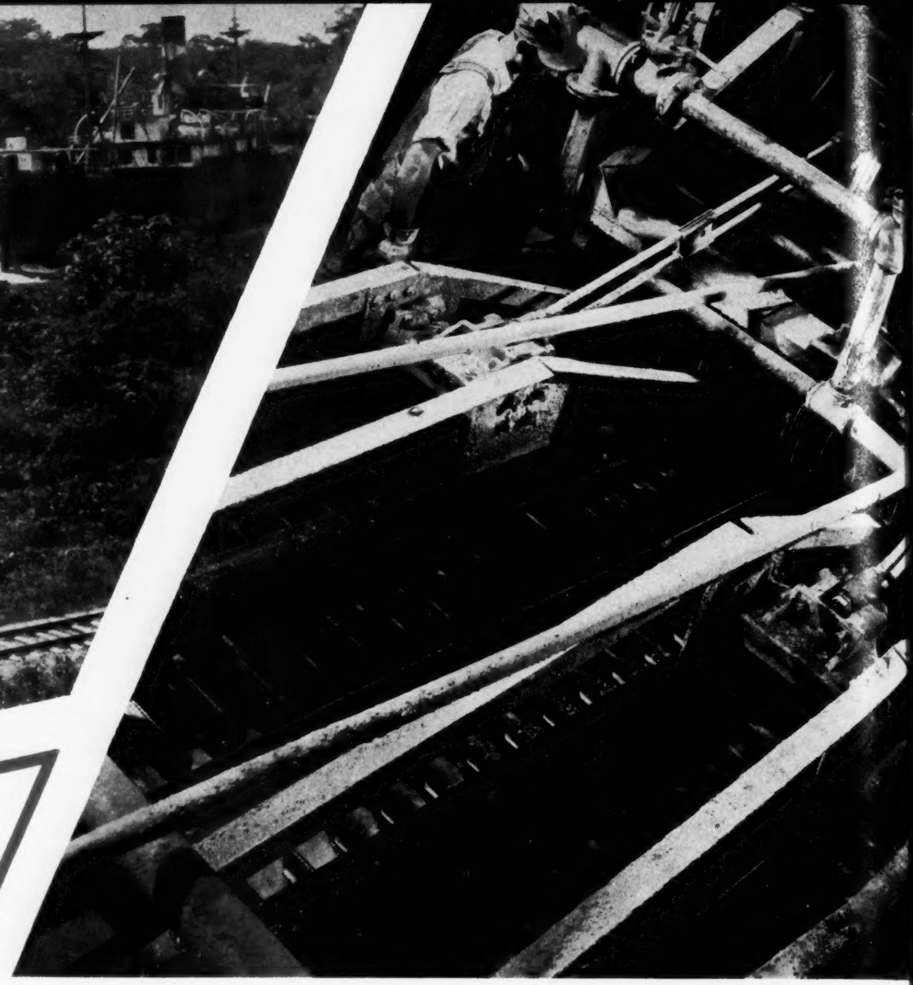
While time has not yet permitted us to accumulate much data, what is now available encourages us in the belief that the process will produce an effluent that will meet the requirements set forth above.

We do not have enough experience yet to give any picture of eventual operating costs, but we are hoping to keep the cost within $50,000 a year.

Below, an over-the-water view of Calco Chemical's effluent plant which shows a portion of the 60-million-gallon settling basin in the foreground. The lagoon shown here covers 23 acres. A five- or six-day detention period in this lagoon after treatment settles remaining suspended material to give a clear effluent.







(Above) Towing bauxite vessel on way to loading point, Suriname.

(Right) Washing bauxite with rake classifiers, Arkansas

BAUXITE

Part II

By Lawrence Litchfield, Jr.

Vice-president, The Republic Mining and Manufacturing Co.

In his second and concluding article Mr. Litchfield continues his informative discussion, widens the scope of his survey and points out some interesting and timely predictions.

STATISTICS published by the United States Bureau of Mines indicate that from 1904, to and including 1939, world production of bauxite has totaled about 43,000,000 tons. About 98 per cent. of this total tonnage has been produced by ten countries as follows:

France	about	13,000,000 tons
United States	about	10,000,000 tons
Hungary	about	4,000,000 tons
Italy	about	3,400,000 tons
Suriname	about	3,230,000 tons
British Guiana	about	3,000,000 tons
Jugoslavia	about	3,000,000 tons
Russia	about	1,200,000 tons
Dutch East Indies	about	820,000 tons
Greece	about	680,000 tons

Figure 1 (Page 292) gives a general idea of the order in which the above countries entered the field as substantial producers. In this figure the tonnages produced by the various countries for each year have been plotted vertically one above the other, so that the vertical distance between the lines connecting these points indicates the approximate tonnage produced by the respective countries for each year. The heavy top line indicates annual world production. This figure is intended to do no more than demonstrate the rapid increase in production and in the number of producing countries which has taken place during the past 25 years and particularly during the past five years.

As stated earlier, France was the first producer of bauxite and with the exception of a few individual years, France has always led the world in annual production. Within the past five years its dominant position has been challenged by Hungary and by Suriname. Before the present war, France not only supplied its own bauxite-consuming industries, but also exported large tonnages to Great Britain, Germany, Switzerland and Norway, and lesser quantities to the United States. About five years ago the export of bauxite to totalitarian countries was greatly restricted by French governmental regulations.

Great Britain has always been the largest customer for French bauxite, which was used for the most part in the manufacture of aluminum. Although there are enormous reserves of bauxite within the British Empire, practically all of the aluminum made in Great Britain before the present war was made from French bauxite. While there has been no reliable information regarding activity in the bauxite industry in France since the be-

ginning of the present war, it is quite probable that these mines have been operating at least to an extent sufficient to supply such domestic demand as has been maintained during the war. It is quite possible that the restriction in ocean shipping has very much congested rail transportation of raw materials in Europe and it is unlikely that much French bauxite has been exported, in excess of what might be termed normal shipments to Switzerland and Germany. There are enormous reserves of bauxite in France. The geological bauxite horizon has been well defined and studied and its continuation from outcrops for long distances underground has been demonstrated by deep drilling. Whereas in most European countries the bauxite deposits belong to the government and must hence be operated under some form of concession, in France the bauxite belongs to the owner of the surface and deposits can hence be obtained by purchase or lease directly from the land-owner.

French bauxite is all monohydrate in character and there are commonly three commercial varieties produced, i.e., "red," "gray" and "white." The "red" bauxite is used mostly for aluminum manufacture and such material commonly averages about:

58.5%—Alumina
3. %—Silica
22. %—Iron Oxide
13.5%—Loss on Ignition
2.5%—Titanium Oxide

The "gray" bauxite often contains more alumina than the "red" variety and also higher silica. Typical analyses would fall within the following limits:

58 to 62%—Alumina
6 to 12%—Silica
8 to 14%—Iron Oxide
3 to 4%—Titanium Oxide
13 to 15%—Loss on Ignition

The "gray" variety is chiefly used for the manufacture of abrasives and cement, although if low enough in silica, it is also used in the manufacture of aluminum.

The "white" bauxite is used in the refractories and chemical industries. Both output and reserves of this grade are limited. In analysis it resembles the "gray" variety except that the alumina is somewhat higher and the iron oxide very much lower, i.e., from 1.5 to 4 per cent. Before the war, average prices for typical French "red" bauxite for export ranged from $3.00 to $4.50 per ton. f. o. b. Mediterranean loading port; frequently bonuses and penalties were stipulated for variations in alumina and silica content from a certain base analysis. French bauxite is mined by both underground and by open pit methods, some deposits being worked by a combination of both methods.

Hungary also has enormous reserves of bauxite. These deposits were developed by German capital to supply the major portion of the bauxite requirements of Germany which has no important deposits of its own. Practically all of the Hungarian bauxite production has been exported to Germany—only a very minor quantity being used in Hungary for aluminum production. Typical Hungarian bauxite contains from

58 to 60%—Al_2O_3
3 to 4%—SiO_2
17 to 19%—Fe_2O_3
14 to 18%—Loss on Ignition

The ore is shipped in an uncrushed and undried condition. Mining is all done by hand in open pit operations and, due to weather conditions, is confined to the period from April 1st to late December. Hungarian bauxite sells for about $3.00 per ton f.o.b. railroad cars, mines, and the average analysis on which that price is based is 58 per cent. alumina and 3 per cent. silica. It is quite probable that since the beginning of the war the Hungarian mines have been worked to capacity to supply Germany with much-needed bauxite.

(Above) Modern open pit bauxite mine in Arkansas.

(Right) Bauxite ship loading station on Adriatic, Jugoslavia.

With regard to Italy, prior to the present war the Istrian production was largely for domestic consumption, but substantial tonnages were also exported to Norway and to Germany. It is problematical how much Italian bauxite has been exported since the beginning of the present war. The embargo on ocean shipping, plus railway congestion in Western Europe has in all probability served to reduce very greatly, if not eliminate entirely, Italian bauxite exports. Istrian bauxite occurs in numerous small pockets which are worked by hand in small open pit operations. Thousands of such small pockets have been located. Istrian bauxite contains on the average from 57 to 60 per cent. Al_2O_3 and 2.5 to four per cent. silica. Before the war Istrian bauxite sold for about $4.00 per ton f. o. b. loading port.

war were such that the bauxite could be loaded on board ocean-going steamers at a cost which was probably lower than obtained in any other bauxite-producing country. In fact Greek bauxite has been delivered at Montreal within the past two years for about $4.00 per ton c. i. f. Inasmuch as practically all of the Greek bauxite exports were shipped by water, it is very probable that bauxite activity since the beginning of the present war has practically ceased in that country.

Most of the Jugoslavian production has been exported to Germany and prior to the war shipments were made by steamer. It is possible that some of the more favorably situated Jugoslavian mines have continued to operate since the beginning of the war and have shipped the output by rail to Germany, but this is merely an assumption. In the past years the United States has imported some Jugoslavian bauxite chiefly for cement manufacture. Jugoslavian bauxite varies considerably in analysis but in general material shipped averages from 55 to 58 per cent. Al_2O_3 and from two to three per cent. SiO_2. Much of the Jugoslavian bauxite averages higher in Loss on Ignition than the other European bauxites, indicating that there is probably a mixture of monohydrate and trihydrate in this bauxite. In general it is the geologically younger bauxite which carries the higher hydration. Pre-war prices for best quality Jugoslavian bauxite averaged between $3.00 and $4.00 per ton f. o. b. vessel's hold.

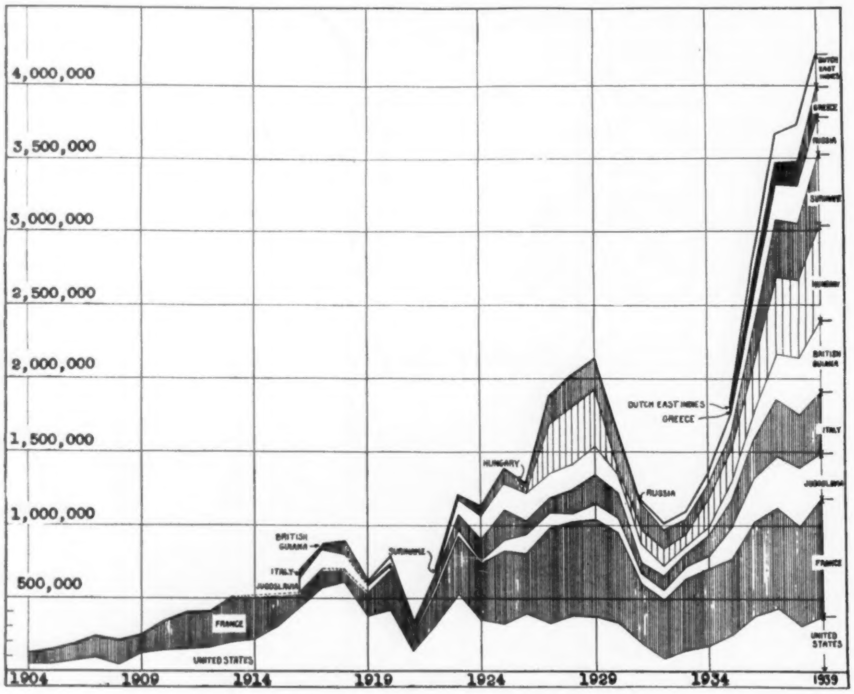


Fig. 1. Bauxite Production by Countries.
Heavy top line indicates total world production (in metric tons).

Prior to the war, Greece was carrying on a growing bauxite business. There was practically no local consumption of bauxite, the entire production being exported to Germany, England, Norway, Switzerland, and Japan. Lesser quantities were exported to the United States for cement manufacture. Greek bauxite varies considerably in analyses but the material shipped is usually very low in silica, i.e., from one to three per cent. and from 54 to 59 per cent. alumina. The Greek bauxite was used in Germany and in England for cement manufacture and also as an ingredient in blast furnace charges in the manufacture of steel. Some of the material exported to Germany was used for making aluminum and the exports to Norway were similarly used. Conditions in Greece prior to the

Little is known regarding bauxite activities in Russia. All of the production thus far has been used within the country, chiefly in the manufacture of aluminum. It is quite probable that bauxite production in Russia has greatly increased within the past year or so.

Prior to the present war substantial quantities of aluminum were made in Norway and Sweden and the bauxite for this purpose was all imported from Mediterranean ports. It is quite probable therefore that these Northern European aluminum plants which had been depending on Mediterranean bauxite have been forced since the beginning of the present war to the use of siliceous substitutes for bauxite, on which they will have to depend as long as they cannot import bauxite.

Bauxite production from the Island of Bintan in the Dutch East Indies was begun by a subsidiary of the Billiton Company in 1935—the first shipments being exported to Germany. A little later Japan began to import bauxite from Bintan and since September, 1939, the entire production from the Dutch East Indies is being exported to Japan. It is reported that Bintan will ship between 300 and 500,000 tons of bauxite to Japan in 1941. The development of the Dutch East Indies deposits is an example of the relatively unimportant role which mere distance plays in world trade with respect to cheap bulk commodities such as bauxite. With ample supplies of Hungarian bauxite close at hand and with additional supplies available from Jugoslavia and Greece, Germany nevertheless found it expedient prior to the war to import very large tonnages from the Dutch East Indies. Bintan bauxite is trihydrate in character and a typical analysis would show 53 to 55 per cent. Al_2O_3, two to three per cent. silica and about 12 per cent. iron oxide. It occurs as loosely consolidated nodules in a siliceous matrix and is mined by open pit methods, no stripping, blasting or crushing being necessary. The ore was formerly shipped undried, but present practice consists of screening out the nodules from the siliceous matrix and drying the former in cylindrical kilns.

All of the bauxite production of Suriname has been exported to the United States. By far the greater part of the output has been used for the manufacture of aluminum. Some "white" bauxite for chemical manufacture was shipped from Suriname between 1927 and 1934, and within the past two years shipments of this grade have been resumed. The largest bauxite producer, and at the present time the only producer, is a subsidiary of the Aluminum Company of America. The operations of this company have thus far been confined to the Moengo mine and mill. It is expected that close to 600,000 tons will be shipped from Moengo in 1940. This company has been constructing a new plant at Paranam on the Suriname River, about 25 miles south of

Paramaribo, which will crush and dry bauxite mined in the Para Creek area. It is hoped that shipments from Paranam will begin early in 1941. The combined capacity of both the Moengo and Paranam plants is about 250 tons of dried bauxite per hour. The Billiton Company which operates the bauxite mines in the Dutch East Indies is proceeding with plans to develop one of its properties in Suriname and to begin shipments of bauxite.

In British Guiana the only present producer of bauxite is a subsidiary of Aluminum Limited. Most of the output from this Colony is shipped to Canada, although substantial quantities have been shipped to manufacturers of aluminum sulfate in the United States. The Berbice Company, Limited, owned jointly by Pennsylvania Salt Manufacturing Company and American Cyanamid & Chemical Corporation, is planning to develop a bauxite property on the Berbice River in Berbice County, British Guiana. This deposit consists mainly of high grade chemical ore and the preliminary engineering work for a mining and shipping plant is completed and construction is about to start. It is anticipated that the first shipments of chemical ore will be made in the latter part of 1941.

Minor Quantities from Other Countries

In addition to the above ten countries, other countries have from time to time produced minor quantities of bauxite. Thus the Irish deposits in County Antrim have been worked for many years although production from these deposits has never exceeded about 15,000 tons in any one year. Likewise British India has been a small though steady producer of bauxite for the past thirty years. Germany has also been a minor producer since about 1917. German production in any one year, according to the best available information, has not exceeded 20,000 tons. Spain, Rumania, Australia, Brazil Indo-China and the Unfederated Malay States have also produced bauxite. It is quite probable that the production in the Unfederated Malay States (Johore) may soon assume substantial proportions. The production on a commercial scale in this country began in 1937, and 1939 reached the figure of 93,740 tons. All of this bauxite was shipped to Japan. The Brazilian deposits have been operated since 1936 and the output has either been used locally or has been exported to the Argentine. Efforts are being made to interest American consumers in Brazilian bauxite.

In addition to the countries which have been producers, attention should be called to the fact that there are enormous reserves of bauxite in various parts of the world which thus far have not been touched. Thus in various parts of Africa, notably the Gold Coast, French Guinea and Nyasaland the existence of enormous reserves of bauxite of commercial quality has been proved. Likewise undeveloped deposits are known to exist in other parts of Africa, in Australia and in China.

The world has little to fear for its future bauxite supply, although a redistribution of commercial sources of the ore will undoubtedly take place from time to time as political or economic considerations dictate.

Preparation for Market and Beneficiation

Speaking broadly the aluminum oxide or hydrate in bauxite is its only valuable constituent and the higher the percentage of oxide the more desirable the ore. Again speaking broadly, the operations performed on bauxite in its various industrial applications are largely those tending to concentrate the aluminum compound into a useful form and to eliminate the impurities.

Thus in the Bayer process, which is the first step in the production of the metal aluminum, the selective action of the caustic on the aluminum hydrate rejects the impurities; but this reaction can be facilitated and cheapened by using bauxite containing a minimum of silica which it is particularly costly to eliminate in the Bayer process itself. Hence, low-silica bauxites are selected for the aluminum industry and when the silica is present in the form of clay which is softer than the bauxite itself such ores are frequently washed and screened to reduce this impurity. Much of the Arkansas bauxite for the aluminum industry has been passed through rake classifiers and over screens to eliminate the highly siliceous fines. Likewise all of the crude Suriname bauxite imported into the United States for metal purposes has been similarly treated. All of the bauxite used in the domestic aluminum industry must be dried to facilitate grinding, and this drying is done in cylindrical kilns at the mines in Arkansas and in Suriname to save transportation costs on moisture.

In the manufacture of aluminum sulfate, the sulfuric acid used is also largely selective with respect to the aluminum hydrate, although acid-soluble forms of the impurities particularly iron oxide are also dissolved with the hydrate to the detriment of the commercial salt produced. Hence, bauxites with a minimum of iron oxide are selected for the chemical industry, since the presence of iron in alums and aluminum sulfate is usually very objectionable. Silica in the bauxite is not objectionable except as its presence in increasing quantities tends to reduce the available alumina. Bauxites for this industry usually contain more than 55 per cent. Al_2O_3 and less than 2.50 per cent. Fe_2O_3 and most of the domestic bauxite shipped to the chemical industry has been rather coarsely crushed and then dried to save freight costs on free moisture. The bauxite imported from British Guiana and from Suriname for the United States chemical industry has been passed over rake classifiers and screens to increase the available alumina by reducing the clay in the bauxite, and after washing it has been dried to reduce freight costs. The removal of iron oxide by magnetic or electrostatic methods has been practiced on a commercial basis in Arkansas for a number of years, and substantial quantities of bauxite for the chemical industry have been so beneficiated. It should be noted that not all bauxites can be profitably treated by magnetic methods. When the iron is uniformly and intimately distributed throughout the mass of the ore, more or less like a "stain," it is not practicable to produce a sufficiently large low-iron fraction to make the method commercially attractive. Only when the physical nature of the ore is such that the high-iron particles and low-iron particles can be separately liberated by fairly coarse grinding, can magnetic methods be profitably used to segregate a low-iron fraction which is a satisfactorily large percentage of the total.

In the electric furnaces producing artificial corundum, the alumina is concentrated by the reduction of some of the impurities into forms permitting their separation and disposal, which again can be facilitated by selecting bauxites which are low in silica and iron oxide and high in alumina. Since the chemically combined water makes difficulties in the electric furnace, this must be removed, and this is done by calcining at the mines to save transportation costs. Some of the domestic bauxite for abrasive manufacture has been beneficiated by magnetic methods to reduce the iron oxide, and this is done after calcination.

Bauxite intended for the purifying of petroleum products is sized by screening and made active by heating to temperatures which are lower than the temperatures used in calcining. Such bauxite can be repeatedly made active to renew its adsorptive qualities.

The question of whether or not to improve the quality of the bauxite at the mines by some method of beneficiation as above described depends on the cost of the process used, the percentage of merchantable material recovered as compared to the total quantity mined, and the relative improvement as to grade which has been accomplished. These factors in turn depend largely on the physical texture of the ore and the manner in which the impurities occur. Thus certain types of American bauxites, consisting of nodules

of hard high grade material in a siliceous softer matrix, were subjected to such relatively crude methods as "log-washing" as early as forty years ago; and there are certain types of bauxites in which the impurities are so intimately and stubbornly locked with the aluminum hydrate that they cannot be economically beneficiated by any method thus far developed.

It is probable that as the relatively higher grade ores approach exhaustion, beneficiation will become increasingly important in this country, and new and improved methods to raise the quality of the ore as mined will undoubtedly be developed. Considerable experimental work with encouraging results, has already been carried out in the field of flotation, and thus it is not unlikely that much of our presently non-commercial reserves may in the future be profitably mined and prepared for market; particularly so as the domestic reserves of bauxite which are of a grade suitable to be mined and used "as is" without beneficiation are limited.

Thus far under this heading we have been speaking of bauxite originating in the United States or in South America for the American market. In contradistinction to the various degrees of beneficiation and preparation of such bauxites, the practice in Europe is to mine ores of a grade suitable to each use and to ship such ores in an undried state. Partly because of the fact that European bauxites are usually denser and thus hold less free moisture than the American ores, and partly because of the relatively shorter distances between mines and consumption points, drying is not practiced. Beneficiating the ore to improve the grade is also practically unknown in Europe and this is primarily due to the relative abundance of ores of high grade and the ease with which they can be selected and mined. Furthermore, the European ores are on the whole far more homogeneous in physical texture than the bauxites of the Americas, and the removal of impurities by any of the methods discussed would be much more difficult and expensive, if not actually impracticable for most of the European ore.

Consumption and Production in the United States

While significant quantities of foreign bauxite have been imported into the United States since the very earliest years of the use of bauxite in this country, it can be said that until about 1923 imports were on the whole a minor factor in the domestic industry. The necessity of conserving our limited domestic reserves of high grade bauxite plus the indications of an ever-growing demand for bauxite in the United States dictated the policy of using more and more imported material. In the year 1923 bauxite imports constituted about 25 per cent. of our apparent consumption and this percentage for ensuing years has had a general upward trend so that in 1939 imports constituted about 66 per cent. of apparent consumption.

Table I taken from "Minerals Year Book 1940," which is published by the United States Bureau of Mines, shows domestic production, imports, exports and apparent consumption of bauxite from 1935 to 1939, both years inclusive. The figures for "apparent consumption" are somewhat misleading, since a substantial percentage of bauxite exports in the form of calcined bauxite shipped to Canadian abrasive plants is re-imported into the United States in the form of crude abrasive, which is fabricated into finished forms and is to a very large extent consumed in the United States.

Table II taken from the same publication shows the distribution of domestic bauxite production to consuming industries in the United States. The expression "dried bauxite equivalent" is used in these tables and some explanation is necessary to clarify this term. Bauxite is shipped in a number of different stages of preparation, i.e., undried, dried, calcined, sintered and partially calcined. By far the larger percentage of the domestic production and of imports has been dried to about 1.5 per cent. free moisture. In order to provide a common basis for statistical purposes the shipment figures have been converted to a dried basis or as it is termed in the tables "dried bauxite equivalent." To illustrate, about 1.5 tons of dried bauxite are required to make a ton of calcined or sintered bauxite so that the shipping weights of the calcined tonnage must be multiplied by a suitable factor to give the equivalent tonnage on a dried basis.

Of the imports for the entire five-year period totalling about 2,000,000 tons, about 287,000 tons were imported for the manufacture of aluminum salts and an unknown but relatively small tonnage was im-

TABLE I

Shipments, imports, exports, and apparent consumption of bauxite in the United States, 1935-39, dried-bauxite equivalent in long tons.

Year	Domestic shipments to industry[1]: From Arkansas	Domestic shipments to industry[1]: From Alabama and Georgia	Total	Imports	Exports	Apparent consumption
1935	253,771	14,114	267,885	199,959	141,060	[2]326,784
1936	352,919	17,056	369,975	322,790	144,445	[2]548,320
1937	415,050	17,614	432,664	507,423	210,657	[2]729,430
1938	275,078	17,253	292,331	455,693	90,341	[2]657,683
1939	335,647	13,689	349,336	620,179	86,540	782,975

[1] From mines and processing plants. [2] Revised figures.

TABLE II

Bauxite shipped from mines and processing plants in the United States, 1935-39 by consuming industries, in long tons.

Industry	1935 As shipped[1]	1935 Dried bauxite equivalent	1936 As shipped[1]	1936 Dried bauxite equivalent	1937 As shipped[1]	1937 Dried bauxite equivalent	1938 As shipped[1]	1938 Dried bauxite equivalent	1939 As shipped[1]	1939 Dried bauxite equivalent
Aluminum	112,154	112,154	194,764	194,764	209,476	209,476	144,208	144,208	161,008	161,008
Chemical	66,316	66,309	74,512	74,741	78,261	79,150	63,940	63,350	81,444	79,536
Abrasive[2]	51,566	86,889	63,654	98,069	88,685	135,849	48,999	74,614	55,346	82,326
Oil refining, refractory,[2] and other	1,758	2,533	1,680	2,401	7,107	8,189	10,332	10,159	14,238	26,466
Total quantity..	231,794	267,885	334,610	369,975	383,529	432,664	267,479	292,331	312,036	349,336
Total value	$1,715,927	......	$2,282,301	......	$2,722,403	......	$1,823,307	......	$2,448,038	......

[1] Includes crude, dried, and calcined, 1935-39; also activated, 1938-39, and sintered, 1939.
[2] Small quantity of bauxite shipped to makers of refractories probably included under "Abrasive."

ported for cement manufacture. The remainder of the imports, or about 85 per cent. of the total, was consigned to the aluminum industry. There is a United States import duty of $1.00 per ton on bauxite which has been in effect since September 22, 1922. From 1913 to that date bauxite was on the free list but from 1909 to 1913 the same import duty was in effect. The wisdom of placing an import duty on an essential raw material which until quite recently was on the so-called "strategic list" and is still on the "critical list," can be seriously questioned, particularly so as there is a more general realization among informed people today than was the case when the duty was placed on bauxite that the known reserves of commercial grade bauxite in the United States are limited. The necessity of importing the lions' share of our requirements is generally accepted, and it is probable that increase in the use of bauxite for aluminum manufacture will be reflected in annual bauxite imports, as long as present manufacturing processes and their quality requirements are in vogue and as long as imports are not hindered by political or economic barriers. In the latter connection it should be noted that while our domestic reserves of present commercial grades are limited, we have large reserves of marginal and non-commercial grades. Metallic aluminum, aluminum salts, and abrasives can all be successfully produced from a technical standpoint by existing processes using domestic bauxites which from a present-day competitive point of view, are of non-commercial grade; the only disadvantage of such practice being higher production cost and hence higher consumer cost. So that even were foreign imports drastically curtailed or even cut off by military or other considerations, our country could carry on indefinitely with what we have. As pointed out under an earlier heading the alumina in bauxite is the valuable ingredient. Impurities must be eliminated and the use of low grade bauxite, by which is meant bauxite containing various impurities to an objectionable degree, requires that these impurities be eliminated either at the mines, or in the industrial process itself. Beneficiation at the mines by new or improved methods would in such eventuality become of far greater importance than is the case today.

Domestic Production

Domestic production is at present confined to Arkansas, Alabama and Georgia, the Arkansas mines supplying about 95 per cent. of the domestic production. Within recent months a few cars have been shipped from a small operation in Virginia.

"Minerals Yearbook 1940" mentions seven bauxite producers in Arkansas as being active in 1939, and two additional producers in the Georgia-Alabama field.

The mining of bauxite in this country is carried on by both open pit and underground methods. Prior to 1924 practically all domestic bauxite was produced from open pit mines. As the commercial deposits under relatively shallow overburden neared exhaustion producers began to develop the deeper lying deposits by underground mining so that at the present time more than half of the domestic production is mined underground. At the same time, due to mechanical developments in the field of earth moving equipment, there has been a gradual increase in what can be termed the economical stripping limit. Ore bodies which fifteen years ago would have been mined by underground methods can now be more economically developed as open pit mines. The amount of overburden which can be economically stripped depends not only on its thickness but also on the thickness of bauxite uncovered. Within the past few years overburden exceeding 50 feet in thickness has been removed and it is quite probable that the future will see deposits lying at even greater depths mined by open pit methods. The mining of bauxite, whether by open pit or by underground methods, presents distinctive problems on occasion because of variation in analysis of the ore and because of the uneven character of the upper and lower surfaces of some of the beds and of their inclination. Underground mining is frequently hampered by the fact that the overlying material, consisting of loosely consolidated clays and sands, makes a very poor roof. Selective mining and blending are frequently necessary to produce satisfactory grades of material for the various uses.

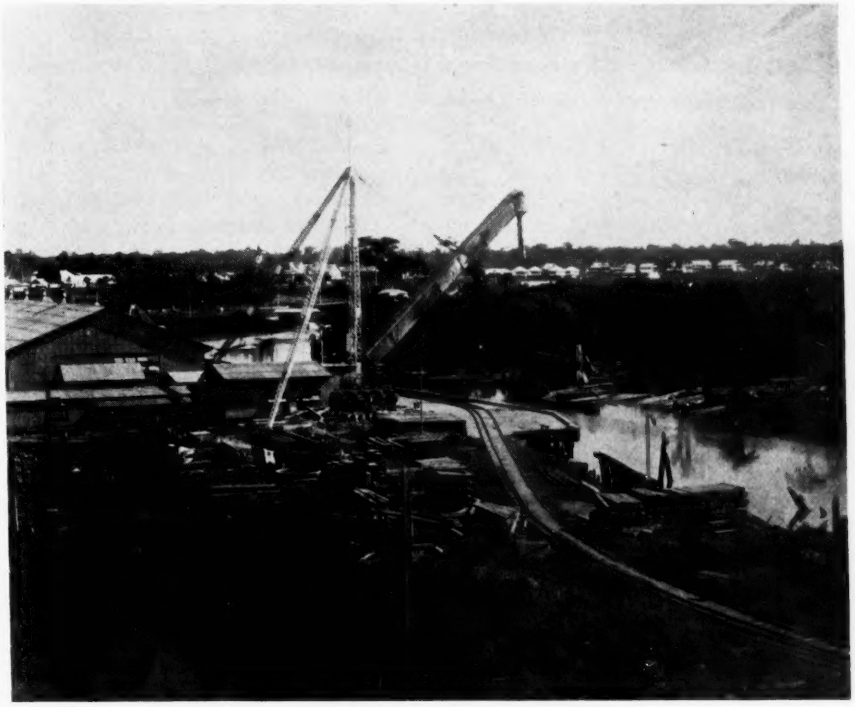
Before mining begins, a bauxite deposit should be thoroughly explored by preliminary drilling, so that mine workings can be laid out to the best advantage from the standpoint of drainage, haulage, and total recovery

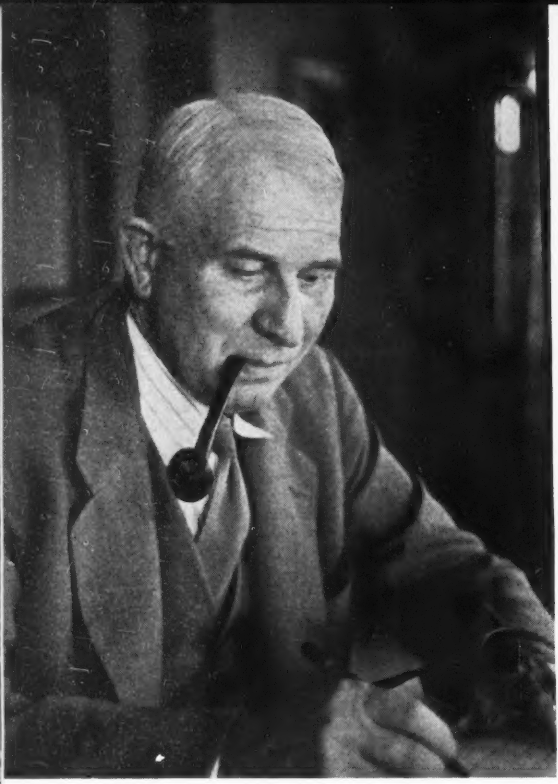
Bauxite Reserves

It is quite probable that our present reserves of bauxites of commercial grade may be supplemented by the discovery of deeper lying deposits in areas thus far considered of no interest. This is particularly true in Arkansas where geological conditions are favorable for bauxite occurrence at depth over an area several times the present productive areas, but the expense of drilling is a deterrent to what might be termed "wild catting" for bauxite; and unfortunately only one of the known geophysical methods for prospecting seems to offer any promise at all with regard to the discovery of deep lying bauxite.

It is to be hoped that nothing will happen to interfere with the continued unrestricted importation of bauxite, but even should this occur, we can confidently expect that United States industry would soon adapt itself to the new conditions and that our present reserves of commercial ore plus increased utilization of lower grade ores would tide the United States consumers over an emergency of any conceivable length of time.

Ship loading boom for loading bauxite on ocean steamers, Suriname





RESEARCH In Industry

By Dr. Walter S. Landis

Vice-President, American Cyanamid Company

All progress has always been and always will be the result of research. Last month in an address at the Printing and Advertising Clinic, sponsored by the General Printing Ink Corporation, Dr. Landis gave a comprehensive report proving this conclusion. The address is presented here as a valuable analysis of a problem that demands constant attention from forward-looking executives and particularly in uncertain periods such as the present era.

I SHALL here define research as an organized campaign against the unknown, but if I merely follow blindly such general prescription I would probably produce a mass of results and end up with a balance sheet looking something like that we receive from Washington from time to time, and ultimately in bankruptcy. The unknown may be compared to an expanding universe. As we penetrate zone by zone, or salient by salient, the outer boundaries keep receding and at a very accelerated rate.

Research is not a new idea. It is merely receiving a great deal of attention and publicity in more recent times. We have always had research so long as man has sought to improve his environment and ease his discomforts. Back in the dim ages of the past when the first human, operating as an individual, made his first discovery it was probably more revolutionary in terms of some form of measurable research unit than many of the developments of today that receive reams of publicity and the loudest of acclaim. That first discovery was made without benefit of association, of equipment, of fundamental scientific data, knowledge of natural laws, and recourse to prior art. It marked a real conquest of the unknown such as never could possibly occur again, for ever afterwards progress has used its past accomplishments to a very material extent as stepping stones to the solution of the problems ahead.

Overlook Early Contributions

As we pass through our large research institutions with their great libraries of impounded knowledge, their intricate and elaborate equipment of great precision, their organizations involving vast experiences in different fields of human activity, we are very apt to overlook the many contributions made by our early ancestors. We are likely to feel that many of the older materials and objects and contributions just sort of came naturally, and were not the developments of research projects quite as complex and requiring quite as much service as many of the recent headliners. In many cases the problem faced by the ancient was difficult, his equipment and facilities were extremely meager, and his failures just as often and as discouraging as we meet with every day in our present highly developed social organization.

The field of the unknown may be likened to a vast space extending outward in every direction to an undefined and moving boundary. Research can penetrate along the line of any one of the infinite radii, each with a specific direction and continually advancing into much of the same variety of activity. Every possible branch of human knowledge is represented in such conception. One may take direction such that the successive steps keep within a relatively narrow confine, or he may choose such direction as to cut across divisions more or less unrelated. This is recognized in two well defined methods of approach. In the one case we operate progressively on the basis of laws and experiences to keep within a relatively narrow field. The other system may be more or less characterized as a hit or miss system in which our approach is not closely related to our last operation yet with the hope that something worth while will result. What that answer is, is a matter of chance and opportunity and may lead to values far afield.

I think sometimes we chemists take too much credit for our importance in the research field. We lose sight of the fact that just as important undertakings are in progress in many other fields, mathematics, astronomy, physics, engineering, psychology, welfare, etc. We have an organized propaganda and merely get more publicity.

Active Research in Every Field

In fact, every branch of human activity is a field of most active research today. It merely happens that chemistry and physics are two very fundamental sciences that influence much of the recognized change going on in this world around us and further that chemistry deals with the more material things that we come into intimate contact with in our every day life. It is, therefore, natural that chemistry should have been one of the tools of the early researcher. He learned to recover metals, to tan skins, to meet many of his simple needs through the application of this science. Once the materials were in his possession then the phenomenon of physics came into play, in fash-

ioning and fabricating them, and combining them into structures. It is, therefore, natural that with such early beginnings and such long history the chemical and physical institutions have become very highly developed as time progressed, and do now occupy foremost positions in this modern world of research, but they are by no means the only roads open to the seeker of new facts, and great masses of our people are equally busily engaged in a thousand other directions and doing an equally important work, even though the results do not always receive the same degree of publicity as the discovery of a new fabric material or the construction of a new tool.

Research is a much over-worked word. It lends itself to magnification, publicity and propaganda, frequently far beyond its real intrinsic value. Much of the mysterious can be incorporated in the conception, and fantastic import is easily compounded, yet it properly deserves none of this. It should be looked upon as a cold matter of fact necessity to the organized progress of our social structure.

Direction, Organization Important

Research to be effective, and to keep within reasonable bounds, imposed by good management, must be well directed and properly organized. An effective director of research is a very unusual type of individual. If he relies wholly upon past experience and precedent he never reaches the real field of the unknown. If he lacks less than the widest of experience in the chosen field of his problem he expends countless hours and sums and reaches few immediately useful goals. He is a rare combination of the theoretical and the practical, a visionary and a realist combined.

He requires organization commensurate with the problems confronting him. Simple ones are sometimes solved by a single individual. As they become more complex he has to draw upon associated sciences and his staff to be effective must comprise individuals specializing in those allied fields. The economic size of his unit, therefore, is very materially governed by the character of the problem ahead.

The capital represented in equipment and tools required for research has an important bearing upon production. Inadequately equipped in this respect one often has to start back in that stage of development that faced his predecessor, even a long way back. The better equipped institution able to throw into the problem the most improved equipment, very greatly lightens the burden and enormously reduces the time spent on the more complex problems. Research, therefore, to be done effectively requires not only a carefully chosen organization of rather unique character but it must be supplemented by very material capital investment in tools and services, and all properly adjusted to the importance of the project. It must be recognized as a proper charge against the particular institution of which it is a part and equipped in keeping with the ability to support.

Turning for the moment to the field of technical research of the private corporation one should first appraise the problems before the particular industry. This is a most difficult task, the tendency being ever to spread beyond the boundaries and broaden into fields that may be more difficult of absorption and development as they mature into future producing units. It must be remembered that in my conception of industrial research I expect to capitalize by the subsequent construction of a producing unit which makes the laboratory fact a commercial and profitable reality. I must, therefore, figure that for each dollar I expend on research I am going to be called for X additional dollars to reduce my findings to practice. It, therefore, is essential that in this industrial research I take some account of the state of the capital market in planning my excursion into the unknown. I must remember that I have competition in my research and that I cannot always lay my results on the shelf because of an unfavorable money market, for I may find my competitor a little more foresighted and which may render my work obsolete. The choice of project, therefore, is not at all simple.

It is always possible to catalogue these projects and arrange them into groups somewhat according to apparent simplicity and which in general parallels the ease of accomplishment and is related to the chance of successful outcome. One must always keep in mind that industrial research is after all a production unit and must yield positive performance, not so much as to the individual project but as to the grouping. The projects brought in by the field organizations forming a part of our industrial unit, and which generally concern themselves with deficiencies in the ordinary products and as measured by the reaction of the consumer, offer a very promising field for the start of a research laboratory. In the first place the entire organization can absorb these developments with the greatest of ease, there frequently only being a modification of production unit or a change of production method to yield a real return.

Production Unit Assistance

A second group of projects and which need not necessarily reach the formal research institution, concerns itself with problems arising in the production units themselves, improvements in qualities of products, in efficiencies of conversion, in short cuts and simplification of operation. In general many of these problems falling into this group are handled by production units but they must be recognized as accomplishments of research and due credit should be given for this extra production activity. Those that reach the laboratory fall in a class not unlike the first mentioned. Solutions of the problems are not too involved, and absorption of the results often not costly.

A third group of projects is those collected by the field organizations and which involve meeting radically new desires on the part of established consumers. These consumers in turn are in much the same situation as the supplying unit, in that they have organization, plant and equipment capable of logical and reasonable expansion into new fields not too much unrelated to their older and more established activities. They too have a fair conception of the general field and line of their proposed new ventures, but need assistance in appraising suitable raw materials for their consumption and which in turn may be in the category of the finished products of my own group.

Here my research laboratory becomes one link of a chain contributing benefit, not only to myself as a producer, but assisting and helping to build a further processing industry as the next succeeding link upon which may be again attached further like expansions. For example, in the mining industry the well set up institution finds, as an ore body is opened up, a material change in the character even to bringing in new and heretofore undetected minerals. Its own metallurgical practice and plant requires research and revision, and it in turn calls upon its own suppliers for new machinery and reagents to make possible this new production. Or a well equipped factory finds that it can adapt itself to a new specialty again calling for new supplies to complete the new assembly. Thus a new industry is founded on the basis of a combination of researches demanding new and different types of intermediates and semi-manufactured materials and yet nowhere in the operations have essentially wholly new organizations had to be founded to meet these requirements.

Direction Sharply Focused

In all such classes of research projects as listed above it will be noted that the direction is fairly sharply focused. The probabilities of successful outcome are very greatly enhanced by virtue of the fact that radical departure from the specific field is held within somewhat narrower limits. The X dollars required to go with the research work is usually relatively small as related to the quantity of production called for, and so in these fields research makes usually a very satisfactory financial record and the nearer one can keep to such activities, the better such record.

It is also important to recognize that

most of this type of research may not originate or be carried out in the formally organized research unit. In allocations of funds and facilities due account should be taken of the outside contributors. The striking of a balance between all of these various groups has a great deal to do with the profit angle of our venture into the research field.

Every research organization should plan to devote a certain proportion of its activity to problems in a much broader field than those listed above. In the very small institution the fraction that can be directed to general research may become too small to be effective. But in the more highly organized institutions there is due some attention to meeting many of the miscellaneous countless human needs not yet satisfactorily solved. These offer infinite opportunity for research, and in consequence the exact choice in such a limitless field should be determined upon the basis of the breadth of the research unit and its stock of tools. A broad haphazard program has relatively small chance of producing results that can be capitalized quickly and consequently should command a lesser fraction of the unit's activity. A broad program yet circumscribed to the general field in which the parent operates has somewhat more chance of success measured in commercial time and warrants a greater proportion of the unit's activity. Here is where the executive and the research director can contribute much to a balancing of the bread and butter type of research listed in the earlier categories against this more general attack on larger problems, so that the whole keeps a sound balance sheet. In this broad field of research the problems are usually more complex, there is less of a background to operate on and costs of the research projects are relatively larger. Also our X factor becomes greater for these types of projects and it requires very careful weighting to determine just how much of this type of work should be undertaken.

Abstract Data a Factor

There is still a further category of research that should be part of every industrial laboratory of the more highly organized type. This is concerned with the addition of abstract information to the sum total of human knowledge and without any general idea of its specific application to an ultimate production unit. There is a mass of abstract data that we do not possess. We do not even know whether its acquisition might have a direct or indirect application to the furtherance of our own general research work. Nevertheless I believe that every institution that can possibly add to this type of knowledge should divert a part of its equipment and service to the furtherance of knowledge of this general type. It is equally important to see that such information is properly distributed through publication or otherwise to the benefit of all. I am thinking here of examples of additions and corrections of physical constants, to supplementing our knowledge of properties, to the cataloguing and coding of general information, and contributions to tables and data of general reference interest. It is our rental which we owe for the mass of prior art that has been handed down to us and upon which we plan so much of our method of approach.

Having now presented the open door to our problems we must leave the specific method of attack within the laboratory for it would be useless to attempt here to even touch upon the infinite variety of detail of method by which research work is actually carried out. Assuming to pass over that period we arrive at the next important stage and that is when to close or abandon a project on which we have had little success and seem to be making but small progress. Every laboratory attacks problems that just seem to get nowhere. Normally the tendency is to carry on, and there is undoubtedly a very large amount of time and money expended on just this type of project always with the hope that tomorrow the situation will change and daylight will begin to appear. There is no general prescription that can be given, as far as I would care to assume responsibility, for determining whether to carry on or to postpone the project. When such project was accepted for study there should have been made, and it should be a part of the record, an appraisal of just what the solution might mean to the institution. As research projects these appraisals cannot be very exact but they should indicate at least whether such a solution is of minor, of limited, or of great importance, as of the time in which they were considered and put into the shop. This should be our principal guide in determining how much expenditure of effort should be made on this particular problem, for if of limited possibility you can readily recognize that it should be cut off sooner than one promising a major revolution in our social life. It requires the utmost care to make such determination to wind up an unfinished job, and yet the errors made in this particular control may become very expensive even to the point of contributing a principal cause to a general revision of a research program, and in extreme cases to great curtailment even abandonment of research expenditure. It is probably the most critical decision that the director of research has to make and it has broken many an organization. Personally I lean rather conservatively to cutting such programs on the short side rather than prolonging them, possibly from the selfish viewpoint that it brings up the average of successful contribution of the unit and creates a confidence both without and within the organization that leads to a better general performance. A group turning out a high average of successful projects, even though many of them are of secondary character, acquires a spirit and confidence that carries them over their more difficult problems, whereas with too much discouragement they stumble over even the incidental, or morale breaks and the unit loses efficacy.

So long as we possess no perfect institutions, no universally applicable products, and cannot answer every question put to us there is room for research. So long as our parent institution can earn some return or by some means can provide funds, it should undertake research on a scale commensurate with the means available. The small institution able to employ one man should devote some proper portion of his time to improving the product or the operating efficiencies, and widen the application, so that the next production will be a better material both in quality and cost. In the larger institution the research unit should be a separate entity and developed on research as its sole problem.

How Much for Research?

Now how much of our institutional resources should go into research? Here too we find no simple answer. There is much argument. Some types of business are inherently hazardous owing to extreme fluctuations in the market and severe competition. In such, a higher percentage of the turn-over should properly be devoted to work primarily intended to keep that institution in business. In the more stable industries which have found a normally equalized market, and which because of age and development are relatively less subject to revolutionary change, a small proportion of the turnover may quite adequately serve to keep such institution healthy and maintain a long and prosperous life.

It has been stated already that a formal research unit involves the assembly of an unusual type of organization. It requires a more or less considerable investment in facilities and equipment. It is, therefore, a type of institution not particularly subject to rapid expansion and contraction from the personnel standpoint without tremendous loss of productivity, for it takes years to break new men into effective research workers. It, therefore, is essentially a continuing operation in which the effectiveness grows with the years. Many of the problems carry over not only from month to month but from year to year and it is not unusual to find very long continuity, particularly in certain groups of projects. In determining, therefore, the expenditures for research they should be planned over years. For example, a five year period is relatively short to budget, at least a round sum capable of maintaining in

operation a very large part of the planned facilities. One cannot disband such institution in times of stress and again pick it up quickly and expect effective results when prosperity again dawns. It is much simpler to pick up journeymen in many of our producing units and place them back into effective operation than it is to carry through a corresponding program in a research laboratory.

It has always seemed preferable to me to consider a research budget based upon a reasonable percentage of gross sales rather than to base this upon net profits. The former is relatively more stable. But just how to arrive at what the correct percentage should be is very much of an open question. In the chemical industry the larger units are accustomed to spend on research from 3 to 5 per cent. of their gross sales, but I do not believe that these figures mean exactly the interpretation that many place upon them. In the first place effective research is carried on in many units of the company and in many directions that can never be segregated from the principal activity of the several units. Actually, therefore, the total research expenditure is probably greater than the published figures. Equally true, however, is the fact that many expenditures are charged to research that lie across a very questionable borderline between ordinary service and research. Services and courtesies to customers frequently use facilities of a research department, yet are in no sense of the word research problems. This may become a very large item drawing upon the time of personnel and the facilities of the laboratory and yielding results only of value to the particular case at hand and not even necessarily of scientific interest. Therefore, these average figures which I presented must not be taken too literally and the error in interpretation may frequently be quite large.

Research Into Enterprise

I cannot but return to our factor X which represents the capital required to turn the results of the laboratory into enterprise. In a very efficiently conducted laboratory this might become as high as fifty times the research expenditure. Normally laboratories do not operate very often or for a very long period at such a rate of production. A figure of 10 is relatively high for even with all the difficulties in proper accounting, we have pointed out that research is frequently charged with more than an exact expenditure within the category of a campaign against the unknown, and also some part of the research charge is often properly devoted to activities that are most unlikely to result in commercial development. Therefore, only a portion of our true expenditure for research, if such could be ascertained, is going to call for a capital expenditure in its future evaluation. Hence, the factor 10 may be high, even though it had the benefit of certain types of research that were not charged against the organized unit. I myself would look as a minimum at a factor of 5 as probably ample fo take care of the immediately useful products of the average laboratory, and when I found that I was not utilizing such sum in my evaluation of the research results I should examine very carefully into the program and the organization of the laboratory. In such appraisal, however, one must approach the problem with a liberal mind, totaling the research expenditure to the best of one's ability so as to eliminate all doubtful items such as sales service, advertising and every charge that is not directly under my definition. Naturally my factor X should not include expansions that follow as a matter of business development over many years, and as pertains to the single project. We always come back to the principle that in a peculiar problem of this kind we actually have no rigid measuring unit and ultimately a decision more or less arbitrary must rest upon the executive, and a leaning toward liberality may be even more harmful from the standpoint of research production than too tight a pinching of the research purse strings.

A Necessity for Preservation

Research can be not only a very profitable item but it also is a very necessary activity for preserving an institution. Today it is a highly competitive branch with thousands of research units, both in the industrial and in the educational institutions, not to speak of large and highly developed miscellaneous independent institutions, as well as those under governmental control. These are all striving to outdo each other and always hoping to contribute something of a major revolutionary character in our social system. Such unit is, therefore, now a necessity to preserve the health and well-being of the parent. Properly organized and operated it is just as much a producing unit of the industrial corporation as is the machine in the factory, and in its treatment it must be dealt with just as any other producing unit. Its accounts should be kept rigorously, its profit and loss balance sheet cast at regular intervals, its personnel examined from time to time as to fitness, and its equipment kept in workable condition and in modern form. It should be housed according to the standards that the institution applies to any other producing unit, possibly somewhat better. It must be called to account for its expenditures, its effectiveness, and the quality of its production, in the same way that we deal with a factory unit. Under such control the question does not arise as to its worth-while contribution.

To sum up, all progress has always been and always will be the result of research. I need add no more.

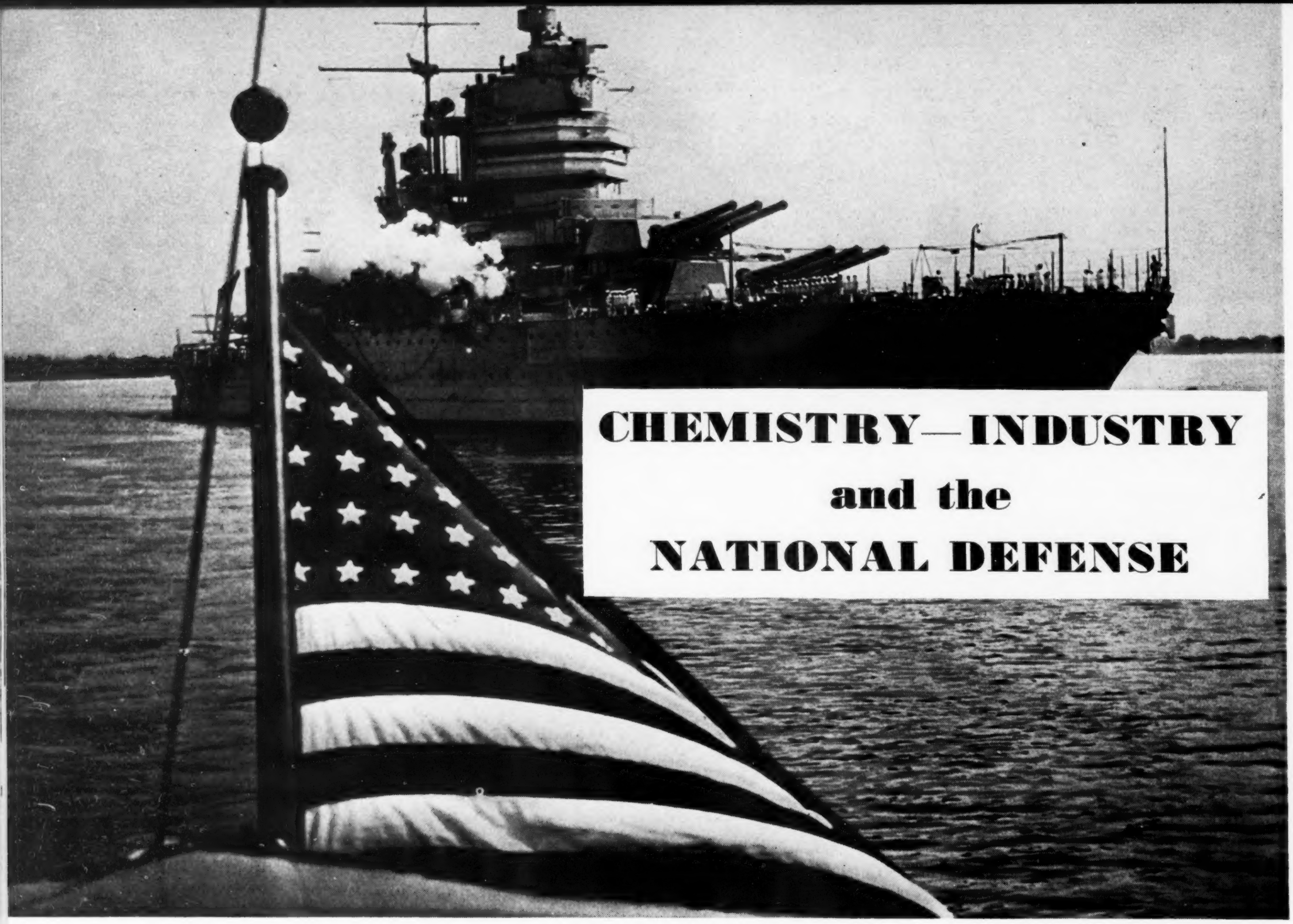
Industry's Bookshelf

Minerals Yearbook, 1940. United States Department of the Interior, 1,514 pages, $2.00 (cloth). The current volume of this valuable publication is the latest product of a program of cooperation between the industry and government that was begun seventy years ago. The value of maintaining comprehensive and cumulative economic and statistical information on production, consumption, sources, prices and stocks of mineral commodities is well recognized and appreciated. Especially during these days when industrial production is running high and minerals from abroad are not easy to obtain, the work done by the Bureau of Mines in compiling these data becomes clear and important. It might be well for many of us to become acquainted with the extent and potentiality of our own natural resources through the Minerals Yearbook.

In this Issue both the metallic and non-metallic minerals are reviewed for the year 1939, which represents an encouraging picture of recovery from the depressed levels of 1938.

Union Policies and Industrial Management, by Sumner H. Slichter, The Brookings Institution, 597 pages, $3.50. During recent years, experience has widened and interest deepened in the whole problem of devising more adequate machinery for the peaceful adjudication of labor differences. The problem is a growing one which will affect the social and industrial and even political future of the nation. The hard facts of the matter, from whatever standpoint it is viewed, indicate that there must be developed a sense of give and take which will still enable exercise of the free enterprise system, or capitalism, which has resulted in so many benefits for America.

In order to intelligently meet the problems and understand the issues, discussion and study are important. This volume by Professor Slichter brings to attention the results of a study begun some years ago. The original project was focused on the policies and attitudes of trade unions with reference to production. The subject was enlarged on a basis of a fuller analysis of a wide range of relationships between trade unionists and employers and in the published form represents a comprehensive discussion of both the content and the process of collective bargaining except as to wage rates.



CHEMISTRY—INDUSTRY and the NATIONAL DEFENSE

MERCURY

By Charles S. Wehrly
Merchants Chemical Company, Inc.

What is the part that Mercury is playing in the National Defense Program? What about production, prices, government policy and outlook? These are some of the questions you will find answered in this article by a noted authority on the subject.

TO the miner, the mercury market has a disconcerting peculiarity in not following his interpretation of the law of supply and demand. To the layman, frequent violent fluctuations are incomprehensible. One however looks at the picture only from his particular production angle and the other from a national and not an international viewpoint. We are now experiencing the longest period of high prices in the history of the metal. With the cooperation of the Bureau of Mines it is to be hoped that the ultimate decline in both price and production will not occur as swiftly as it did in the aftermath of the last World War. At that time values dropped from over $125 in 1918 to $46 in 1922; output fell from over 35,000 flasks in 1917 to a record low of about 6,000 in 1921. The miner's name of "Quick" aptly described the manner in which hopes, aspirations and profits must have disappeared.

Consider then what must take place when at last this war ends and abnormal demands from circumscribed properties return to the commonplace, when the protection of continental disturbances has been removed and we face competition from sources whose ores are richer and whose costs are lower. If at that time we have not profligately exhausted our reserves, but have made considered amortizations of plants and debts, and provided for proper depletion of ore bodies, we will possibly emerge with a better mutual appreciation of the problem by the miners. The only loss (probably fortunate) will be experienced by the marginal producers whose properties will revert to the quiet hills to awaken when again we may need emergency supplies.

Production Shows Increase

Since September 1939 the price of mercury has not fallen below $132. Production, since the inauguration of the monthly Bureau reports shows an increase from 1500 flasks in September 1939 to a high of 3700 in December 1940. The total output for 1940 was 36,300 flasks of which 9615 were exported, with negligible im-

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"The Arsenal of Democracy"

Continuing the series on "Chemistry—Industry and the National Defense," Chemical Industries this month spotlights the parts that Mercury and Glass occupy in preparing this country, come what may. Other articles on Chemistry's role in our national defense program will follow in the next few months.

ports. Prices started to climb in September 1939, were dizzy during that month, and, considering the large increase in production, reacted to a low of $132 in December. The market abruptly increased in January 1940 to $180 and gradually declined until May when the low was $169 and the high $196. This advance continued through June and July, reaching the high point of over $200 a flask in June. Continually enlarged output (1800 flasks in January—3200 flasks in July) left a surplus over consumption and if it were not for the fact that exports, principally to Great Britain, were permitted the decline would likely have been more precipitous. The market eased through the balance of the year to $162 in December. This year opened with steady prices, but with extraordinary purchases by Federal agencies during late January and February, a tight position on spot and nearby metal developed, which increased prices to the present level of about $170.

Forecast Not Difficult

It was not difficult to forecast this increase in both price and production—assuming of course that one's conjecture as to the extent and duration of the war was correct. Actually in 1938 it was predicted that an annual production of 39,000 flasks would result if prices of over $100 were maintained for 8 months or longer. Prices for mercury are, however, based upon so many undeterminable factors that the prophet may lose not only his beard but his shirt besides.

In this arc of the cycle the miners have been aided not only by the belligerency of Italy—probably the world's largest producer today—but also by the "friendly" gestures between Germany and Spain, the rapacious attitude of Japan and the needs of our own defense program.

As expected, this war's demands are coming principally from needs other than the explosive industry—although that industry's requirements must have increased tremendously. Rather are they an intensification of normal peace time requirements — medicinals, oxides for ship's paints and the thousand uses which comprise the varied applications of this metal.

AUTHOR

Policy of Stockpile Not Clear

The policy of "stockpile" is not clear unless the government proposes to produce its own finished products, since all important manufacturers of mercurials have previously experienced these storms and taken precautions to see their cellars well stocked. In 1940 the average monthly production was slightly over 3000 flasks, consumption about 2200. The average in the hands of consumers and dealers was nearly 13,000 flasks or about six months supply. If the government's aim is to assist the producers, the result has been to the distinct advantage of a few and only incidentally advantageous to the rest by reason of the umbrella of prices paid. The quantity which may be required for such stockpile purchases is open to debate. Too much and the mines are depleted at high prices—thus sacrificing our natural reserves; too little and we are not ready for the "emergency."

When we first had doubts as to our productive capacity, the metal was placed under export license control, an action which resulted in a slight drop in prices. Later when the functioning of the control was favorably exercised towards certain nations, the unwarranted hesitancy was eliminated and the market recovered.

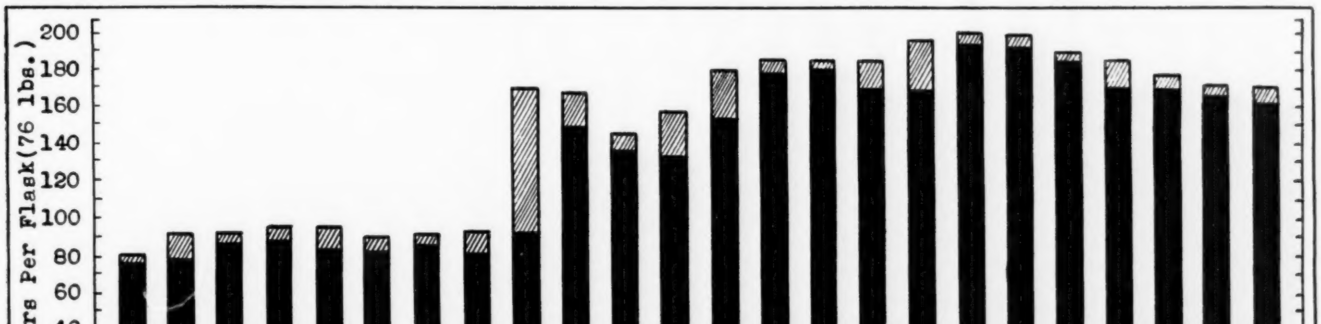
To Purchase Mexican Mercury

Recently another phase of this government's policy was evidenced by the statement of its willingness to purchase Mexican mercury. Today's price in Mexico is approximately $30 higher than in this country—and this exclusive of an import duty of about $20. The purpose therefore must be described as an "economic sanction" since certainly Mexican mercury has not affected this market for over a year.

Today the demand from all countries except Russia, Japan, Germany, Italy and Spain must be filled by mercury from Mexico, China, Canada and this country. The channel for Germany, Italy and Spain is fairly well defined. Japan has been prominent in purchasing Mexican metal, hence England has had to depend upon its reserves, the increasing production of Canada, this country and the sacrificed metal of China.

The outlook is cloudy. Foretell when peace returns and foretell the market. Possibly the present Italian properties may again change hands, possibly China will again import and even this country may need foreign metal. The impetus, the opportunity for exploration, development, and consultation should place—and it is hoped has placed—our quicksilver industry in a more sane and sound position.

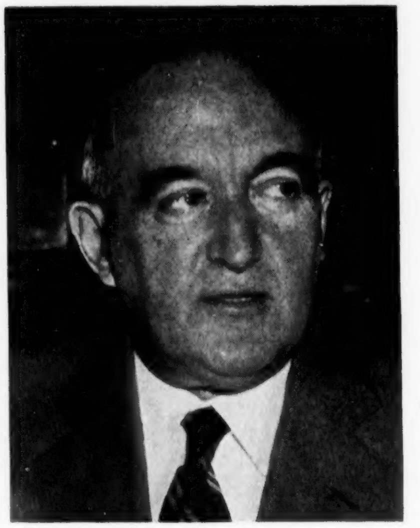
Mercury Prices—New York Market (Shaded portion indicates range of high and low prices for the month).



GLASS

By H. S. Wherrett

President, Pittsburgh Plate Glass Company



The glass industry is 5,000 years old. Its interesting development has come about with many contributions from many different nations. Our own glass industry will contribute much to the national defense program, among which will be such products as bullet-resistant goggles, safety glass, optical glass and many other such aids.

ALTHOUGH the known history of glass goes back more than 5000 years there has been no letup in the discovery of new kinds of glass and better methods of applying it.

Because our research laboratories are finding new and better methods of manufacture and because we have been able to discover new outlets we are still in what can be called a glass age.

Glass as we know it today came about by gradual development, as somebody happened to put in a new ingredient in the pot of glass. At one time it was felt that glass could not be made until a goat was cut up and the blood drained and put over the floor of the furnace. That was necessary if one wanted to get good glass that had no seed nor serious defects.

The glazes of the potter's art were presumably the origin of modern glass as we know it. The natural Lava glasses that came from Mount Vesuvius are the original glasses which men tried to duplicate.

In ancient days it was the custom of victors or conquerors to assimilate all the knowledge they could get from the visited or conquered territory. They endeavored to gather all the knowledge possible, and consequently, the knowledge of one country was widely disseminated throughout other countries. It was impossible, therefore to assign authentic origin for many products.

We find in 1500 and 1400 B. C. the first evidence of production of glass—the first positive assignment of localities and definite dates. In Rome, research led to translucent glass and rather beautiful colors. They led, perhaps, to the immediate forerunners of present-day plate glass sheets.

In Pompeii, there was found glass rather large in dimensions for that early date. The colors were rather beautiful—translucent, not transparent. They were used for decorative purposes, so transparency was not essential. Even in ancient Rome, the use of glass for hot frames was suggested. The original research in greenhouse development and the development of greenhouse glass started before Christ and took several thousands of years to become effective.

In Venice, beautiful transparent glasses were developed, but primarily for decorative purposes. They made better vases, goblets, wonderful pieces of artistic ware. They also developed the Crown glass, which originated in Syria where the glass was blown.

In the Crown process, a somewhat spherical globe was blown on a pipe. Opposite the pipe, the globe was flattened and a solid iron rod called a punty was fastened to the flat part. The neck of the globe was then cracked off at the pipe. Then the glass supported by the punty was re-heated. By rapid rotation, the globe was opened gradually until the glass spun out in a flat disc. The thick portion to which the punty was attached was the bull's-eye. The bull's-eyes from which these glasses were derived have become so popular recently in England that some of our producers have gone into the modern production of ancient bull's-eyes.

Mirrors were created in Venice by the use of tin and mercury as an amalgam on the back of the sheet of glass. Probably few of us today would be able to make a tin-mercury amalgam mirror. They were very satisfactory. They were better than anything that had previously been known. But they certainly "saw through a glass darkly," in those days.

The development of the chemical age in which we are living came along about 1860, when the mirror which we presently use was produced—the precipitation of a continuous film of pure solid silver on the back of glass to produce a mirror.

We have developed by very, very slow stages in the glass industry. Research was largely taboo for many, many years. It remained for the Northern European people to evolve a glass technique, and a glass research, which resulted finally in clear transparent window glass.

Here is a curious fact. Window glass cannot be used in the observation windows of our United States Post Offices, used for discovering thievery among the personnel. Along in the early 1700s, or the late 1600s, a man was brought to trial for murder. He had been seen to raise a dagger and another man had been seen to fall by someone looking through a sheet of window glass. All of the evidence which had been gathered indicated the man who raised the dagger was the murderer. He came to trial and evidence was introduced to show that instead of three people, as the people upstairs had thought, there were four people present. The man who raised the dagger was acquitted. The man who actually committed the murder could not be seen at all through the window glass. Consequently, in order to prove that anything has occurred in a post office department, which has been observed through a window by the post office inspector, he must be able to see and observe through plate glass in order for the court to sustain his evidence. Thus the superior quality of plate glass receives official recognition.

In England, the development of "Flint" glass brought a new era in glass manufacture. British Flint was primarily silica. It happened to contain a very small percentage of lead and that lead produced a brilliance in glass not previously known.

Then began the movement of the glass industry from the European continent to the British Isles and the use of British Flint became the general conception of perfection in glass consciousness.

The origin of plate glass dates back to somewhere around 1690, when there was developed a means for casting flat glass and rolling it out. To be sure, it was opaque, rather than transparent. No one knew how to grind and polish it in a big sheet. It had to be done by hand. Again, this took nearly 100 years to develop. In France and Germany almost simultaneously a method of grinding and polishing these large sheets was evolved.

Development of the plate glass casting table is interesting. They started with copper, but the intense heat of the glass on the copper caused it to oxidize and split and crack. Then they conceived the idea of using iron, and again the heat was more than the body of the metal could

stand for the size of the table used. Someone conceived the idea of casting pipes or tubes in the core of the iron slab. This made it possible, by pumping water through these pipes, to maintain the casting table cool enough not to crack. The result was a sheet of reasonably flat glass. The rolling method came next—the device for rolling out the precious glass with the homely rolling pins resulted also from the water cooling of the table.

In America, glass manufacture began about 1608. As a means of trading primarily with the Indians, the production of beads and trinkets was started. In 1856 there was an attempt to establish a real glass factory in Massachusetts which failed; and again in 1865, Theodore Roosevelt, father of the late President Theodore Roosevelt, established a glass factory in Lenox, which lasted six years before it failed.

In Creighton, Pa., in 1881, "The New York Plate Glass Company" built the first factory in the world to use natural gas as a source of heat in the production of glass. In 1883, the name was changed from the New York Plate Glass Company to the Pittsburgh Plate Glass Company.

Meanwhile, in 1881 at Crystal City, Mo., the fine glass sand available there was discovered and the production of plate glass began there and has continued ever since.

In 1893 the total production of plate glass in the United States was 25,000,000 square feet. In 1940 the total production approximates 225,000,000 square feet, approximately nine times as much. We have seen the change of manufacturing plate glass exclusively in large pots or crucibles, casting it upon a cast iron table, rolling it out in the form of a huge pie, grinding and polishing on a large table over a period of 24 hours to make the finished product, to the present day process of melting glass in large tanks, rolling it out in a thin sheet, when much less grinding needs to be done to produce the finished product on a quantity basis not possible by any of the old methods.

In the old table casting process, the presence of sand or dust on the table produced large lifts and waves in the sheets of molten glass, which had to be ground away to get a flat sheet. To get 1/4 inch glass often it took 1/2 inch glass to start with, or possibly more. It was necessary to get to the bottom of each valley in the glass, and great quantities of glass had to be thrown away.

The development of the sheet-drawing process occurred in the early 1900s. Flat drawn sheet glass originated around 1904 in Western Pennsylvania. In Belgium at about the same time. Those two processes were met by a third one which was developed somewhat later, and all three methods can be attributed to research, the requirement for new processes and the demand for greater volume of product. Previous to 1928, building and construction consumed far the larger proportion of all glass used. Research and expansion in the means of transportation and travel produced the automobile, and a tremendous increase in demand for glass. Around 1920 came the development of the present annealing process in this country, which was usurped by Europe and European manufacturers without any particular remuneration.

The materials used in plate glass and window glass manufacture are essentially identical—silica or sand; calcium oxide, sodium carbonate, or baking soda. They are melted together at a temperature of about 2500 degrees F. This produces a highly transparent plate or window glass. The tanks in which these batches are melted were developed by Lord Bessemer, the great genius of the steel industry. He made the first glass tank. He made the first sheet of glass rolled out as a continuous ribbon.

Then came the invention of the big ring roll for the pot production, and the Bicheroux process; then the development of the continuous lehrs in which the glass moved steadily forward instead of by fits and starts, as it had previously done. Instead of being pushed by hand from one furnace to another, the plate of glass moves forward into the furnace by mechanical means and continues to move thus on the grinding and polishing machines instead of being polished on the old circular tables.

Careful grading and handling of the various types of abrasive used in the various stages of grinding and polishing—all of these methods were the result of research—all new processes and new articles of commerce.

The development of new means of making things, very frequently leads to confusion in the minds of the consumers. Because made by different methods, the product must be a different item, they think. Sometimes that is a very hard thing to overcome, but again research, careful investigation can be depended upon to demonstrate the exact improvement made in the old product.

Within the last 15 years we have developed many new types of glass. In plate glass, highly transparent glasses, which have better light transmission—which can transmit 91 per cent. of the total light—have become very widely useful. Normal glass transmits about 89 per cent. of light. That difference of two to two and one half per cent. is highly important in many places.

The development of heat-absorbing glass has been rather more recent than the development of the highly transparent glasses. Our European brothers have made X-Ray absorptive glasses for some time now. It took American ingenuity and research to make the new X-Ray glass more effective and more highly transparent than the European product.

The growth of new colors in glasses, new variance of colors, colored glass with complete transparency has come principally within the last few years. Special glass for the absorption of specific wave lengths of light has come very recently.

Glasses used by the Navy and Army for safety and defense of the country have been produced in Europe until relatively recently.

The development of double glazing and other multiple glazing has all principally come within the last few years. This will include, also, storm windows which were first used in Russia because the winters were so long.

Goggle lenses have been developed only since 1917. We have bullet-resistant glasses which are capable of giving the absolute protection which our flyers and those in other services need if we are to defend ourselves properly. It is possible to make laminated safety glass stop a bullet traveling 2,750 feet a second. We have changed the production of plate glass thickness from something that might be 1/4 inch at one point or 3/16 or 9/32 at another to a uniformly accurate thickness over the whole plate. Today, we make plate glass in various thicknesses from 7/64 inch to 1 1/4 inch and we can depend upon the thickness of each to be uniformly accurate.

Below, the use of glass blocks in modern architectural structure. Glass will release certain materials needed badly in many defense industries.

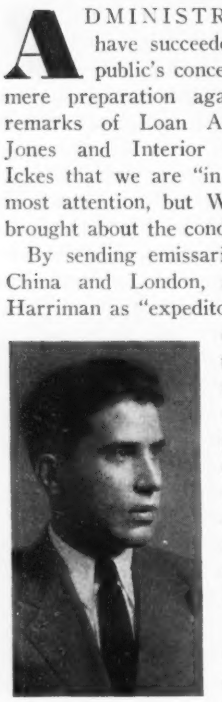
Washington

By

MACK H. WILLIAMS

ADMINISTRATION leaders have succeeded in changing the public's conception of defense as mere preparation against attack. The remarks of Loan Administrator Jesse Jones and Interior Secretary Harold Ickes that we are "in the war" received most attention, but White House action brought about the conditioning of opinion.

By sending emissaries to the Balkans, China and London, appointing W. A. Harriman as "expeditor" in England, and creating an industrial planning board to achieve maximum war goods production, President Roosevelt made it plain that our first lines of defense are the nations fighting the Axis.



Mack Williams

Acceptance of this principle is a necessary prelude to the next stage of our production effort, which is large-scale distribution of fighting machines and munitions. It forestalls criticisms that the arms program mapped for 1941 and 1942 is a certain sign we will enter the war. The Administration prefers to regard such activities as self-defense—aggressive and unorthodox self-defense, to be sure, but still short of war.

The first rumblings of all-out production were accompanied by signs that a new agency is planned to handle distribution of war goods to anti-Axis countries. This step would be in keeping with the President's dislike for a single, powerful, over all body. When issuing of contracts was the main concern, the President set up the National Defense Advisory Commission. The shift into production found the Office of Production Management in the saddle. Soon we will have to decide how best to allot the weapons that will pour out of our plants, and a new body, in which Harry Hopkins is reported to wield much power, is in the making.

As a member of the nine-man Production Planning Board organized last month, Hopkins will also be a strong influence in determining how the government will let out the next big wave of contracts—which will include about $500,000,000 for construction of new explosives, powder and munitions plants.

John D. Biggers, OPM production director, indicated the board's wide scope when he stated it had been established in his division "in recognition of the importance of both short and long-term planning of the defense effort and its effect on the national economy as a whole."

Samuel R. Fuller, president of North American Rayon Corp. and American Bemberg Corp., is chairman. In addition to Hopkins, the members are George W. Meany, A. F. of L. vice president; James B. Carey, C. I. O. secretary; John L. Pratt, former executive vice president of General Motors; William E. Levis, chairman of the board of Owens-Illinois Glass Co.; Robert E. Dougherty, president of Carnegie Institute of Technology; Admiral William H. Standley, former chief of naval operations; and Major General J. H. Burns, former commander of the Raritan Ordnance Depot.

Expansion Test

Gano Dunn's report on steel is regarded in Washington as a victory for industry over the New Deal theory that a 25 per cent. plant expansion must accompany the defense program to render it painless to civilian consumers.

Fearful of the post-war slump such expansion would bring, business men insisted defense needs could be met by priorities and curtailing of some supplies to non-essential industries. Steel was the battleground on which the issue was fought, and Dunn, OPM engineering consultant, reported to President Roosevelt that steel capacity is more than enough for the United States, Britain and her allies, and even the increases in consumer demands expected to flow from the greater national income in the next few years.

Precautionary measures must be taken, however. These include distributing orders evenly among steel companies to prevent a backlog at any one plant, reducing the shutdown for normal repairs and eliminating potential coke and pig iron bottlenecks. Pooling of steel orders is to be voluntary if possible, but the report indicated strongly it would have to be done eventually by the OPM priorities division.

Priorities last month were invoked for the first time on an industry-wide mandatory basis of aluminum and machine tools. Defense orders are to have preference ratings not lower than A-2, Priorities Director E. R. Stettinius, Jr., ruled.

"Priority techniques" have been invoked for magnesium, neoprene, commercial aircraft, zinc, potassium perchlorate, structural steel shapes and stainless steel. These are based on more or less voluntary cooperation of the industries involved, but it is only a question of time before they go under formal priorities.

That they will be followed by the long list of raw materials which have been strained by defense, as exemplified by sulfuric acid, is the belief of many OPM officials. Fixed prices for second hand machine tools were issued in connection with tool priorities, but this will be extended to other products only in rare cases. Price Stabilization Commissioner Leon Henderson prefers voluntary price control supplemented by vigorous crackdowns and public exposure of unjustified rises.

A new working arrangement on priorities has been evolved by OPM. Army and Navy Munition Board, as in the past, will determine priority ratings covering all items on the critical list. The Munitions Board will also handle extension of priority ratings down to the first subcontractor, for items on the critical list.

OPM's priorities division will issue ratings for all raw materials, for extension of ratings below the first subcontractor, for items not on the critical list and in the general field of commercial and civilian needs.

Priorities certificates are mandatory "in the sense that they may be enforced, if necessary, though it is hoped that contractors affected will cooperate." The chemicals section of the priorities division will administer ratings in this field, working closely with the advisory committee headed by Dr. Harrison E. Howe.

Washington Notes

Congress has revised the 1940 excess profits tax bill to meet the complaints of so-called "growth" companies. Taxes were computed on the 1936-1939 base, and 1940 profits of the companies were far in excess of this four-year average. As revised, the bill gives greater weight to earnings of the 1938-1939 period than the 1936-1937 period. Chemical companies are not as a rule in line for benefits, although they form the dominant "growth" industry, because 1938 was a poor year. The 1938-1939 chemical profits average is the same, or even less than the 1936-1937 average. One benefit, however, is the new provision that unused tax credits can be carried over for two years instead of one.

(*Continued on Page* 348)

"Headliners" In the News

Right, Dr. James Bryant Conant, president of Harvard University, and Frederick L. Hovde, assistant to the president, University of Rochester, are two chemists on President Roosevelt's three-man mission to Britain which will keep the U. S. informed of scientific developments important to national defense. Dr. Conant who heads the group will remain in England a month. Hovde remains as permanent secretary of the Defense Research Committee. Third man on the mission is Carroll L. Wilson.

Above (left to right), Dr. A. E. Boss, recently named manager of pigment sales for Columbia Chemical Division, Pittsburgh Plate Glass; Dr. William G. Theisinger, newly appointed Director of Welding Research for Lukens Steel Company, Coatesville, Pa.; Carl F. Miller, whose company has been appointed sales representative for Stroock & Wittenberg in the Pacific Northwest; S. Allan Jacobs, general sales manager of Inca Manufacturing Division of Phelps Dodge Copper Products Corp., who has been made a vice-president of the company.

Below, branch managers, sales personnel and engineers of Western Precipitation Corp., who met recently at Los Angeles. (Left to right) first row: A. A. Heimrod, C. H. Brandes, Walter Penick, C. J. Heath, A. W. Robinson, A. L. Keener. Second row: F. H. Viets, C. B. Clyne, A. B. Reamer, Walter A. Schmidt (General Manager), Evald Anderson, Richard O'Mara, D. S. Robertson, D. W. Bowman, C. H. Weiskopf, Malcolm Schmidt, S. Paul Lindau, N. M. McGrane.

Above, Dr. Edward A. Doisy, St. Louis School of Medicine, chosen to receive '41 Willard Gibbs Medal from Chicago Section, American Chemical Society.

Technical Association of the Pulp and Paper Industry

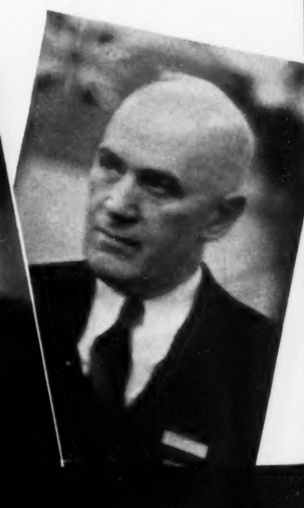
TAPPI held its twenty-sixth annual meeting at the Roosevelt Hotel, New York, Feb. 17-20. Annual Luncheon scene at right pictures D. C. Everest, Advisory Committee to the Council of National Defense, delivering his address on "National Defense and the Paper Industry." Below left, W. H. Joy presented paper "A. T. & T. Business Papers Purchase Standards." Below right, H. L. Bode, Robert Gaylord Container Corp.

Right, Elmer W. Peterson, Chief, Bureau for the Associated Press at Stockholm, Sweden, addresses annual luncheon gathering.

Above, left to right, papers presented by J. R. Buchanan, "Performance of the Stream Flow Vat System on Nine Point"; Don Allshouse, "Copes Consistency Control"; A. H. Nadelmann, "The Mechanism of Softening Water."

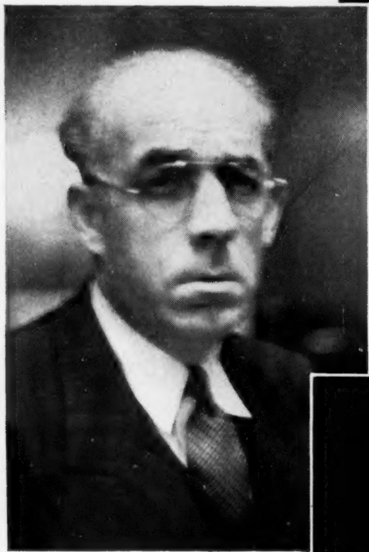
Above, R. L. Kreyling, Sales Engineer, Philadelphia Quartz Co., and L. K. Burnett, Tech. Director, Robert Gair Co. Below, left, R. G. Simonton, Mgr., Union Mills Paper Mfg. Co. Right, H. H. Brown, Consulting Chem. Eng.

Left to right, J. D. Malcolmson, Robert Gair Co., Chairman Containers and Testing Session; T. A. Carlson, Forest Products Laboratory; Pierre Drewsen, Chem. Eng., Hinde Dauch Paper Co.; R. L. Beach, Supt. of Packing, General Electric Co.



Salesmen vs. Purchasing Agents

Five purchasing agents pitted their wits against five sales executives at the Hotel Pennsylvania last month in an intimate and friendly discussion (for once) of purchasing and selling. The program, under the sponsorship of the Purchasing Agents' Association of New York, was conducted like "Information, Please," with the questions being fired by Professor Alvin C. Busse of NYU. "Pop" Hall of the National Association of Purchasing Agents acted as judge. H. K. LaRowe was general chairman of the meeting. Typical question: "Do you think that purchasing agents are taking advantage of priorities?"



Above, Daniel J. Healy, Eastern Division Sales Manager, Spencer, Kellogg & Sons Sales Corp. Right, Frank W. Lovejoy, Sales Executive, Socony-Vacuum Oil Co.

Above, T. A. Clohosey, Purchasing Agent, Westinghouse Lamp Division, Westinghouse Elec. & Mfg. Co. Left, Dr. Russell Forbes, Commissioner, Dept. of Purchase, City of New York.

Left, Dr. Paul Nystrom, Pres. Sales Executive Club and Prof. of Marketing, Columbia University. Right, H. A. Manderson, Supervisor of Purchases, Continental Can Co. Below, left to right, W. H. Oliver, New York District Manager, Republic Steel Corp.; S. W. Mays, Purchasing Agent, American Cyanamid Corp. and Subsidiaries.

Below, G. H. Reid, Manager, Industrial Dept. of N. Y. District, General Electric Co. Below, right, Alvin C. Busse, New York University, Master of Ceremonies.

Below, T. I. Savage, Purchasing Agent, Murphy Varnish Co. Below, left, W. T. "Pop" Hall, Natl. Association of Purchasing Agents.

PLANT OPERATION AND MANAGEMENT

Photo Akron Beacon Journal.

Pilot Plant Precautions at Columbia Chemical

In the full-scale pilot plant of the Columbia Chemical Division, Pittsburgh Plate Glass Company, Barberton, Ohio, which takes up its work where the company's micro-plant and laboratory leave off, full precautions are taken to safeguard the health of the men against poisonous gases, as shown here.

A DIGEST OF NEW METHODS AND EQUIPMENT FOR CHEMICAL MAKERS

CHEMICAL LABOR

and the Operation of the Draft Act

By Albert J. Gerathy
Schering Corporation

The author, who is Superintendent of Chemical Manufacturing for the Schering Corp., is in a particularly good position to know what he says about this timely topic. Its importance to executives cannot be under-stated, especially at the present time.

THE problem of skilled labor in the chemical industry may become more serious than that which exists in the machine trades because of the scarcity of the type of men who can be trained to become good operators or laboratory technicians and the length of time it takes to educate a man to carry on satisfactorily and safely his duties in this field. These difficulties were experienced during the last war.

We suspect that this problem of securing desirable apprentices (rejecting two out of five as incompetent) and finally educating them to be operators for highly skilled operating work faces not only Schering Corp. but also many other chemical companies in the United States.

Labor in the Chemical Manufacturing field is divided roughly into technical supervision or control chemists, laboratory technicians, and plant operators. Studies of labor in the Schering plants reveal that:

Regardless of background, no graduate chemist can assume the duties of a control chemist or division supervisor and execute those duties entirely satisfactorily in less than four years. The reason for this is that a control chemist must be trained

1. To execute properly all duties connected with processing all products in his department and know the reason for such procedures.

2. To know all technical facts concerning all products in that department, together with control tests and equipment performance. He acquires this knowledge by observing over a period of years the chemical characteristics of the compounds, all accidents and their causes, all yield variations and their causes.

3. To supervise intelligently the performance of other men and to be able to handle them without creating personnel problems.

4. To understand the fundamentals of chemical accounting and bookkeeping.

Regardless of background, no man can be considered to work without supervision as a laboratory technician or a plant operator in less than a year. Experience has shown that in nothing less than two years can a man attain the status of a first-rate plant operator or a full-fledged laboratory technician. The reason for such a lengthy training period is that:

1. Many months elapse before a man has acquired the manual skill necessary to handle glassware or to set accurately flow rates by means of valves.

2. No operation is continuously repeating; i. e., each chemical processing step is composed of many nonrepetitive operations. These may occur only once or twice a month.

3. No product is manufactured on exactly the same production schedule each month. The result is that what runs this month may not next month. Hence, what a man masters this month, he may not repeat for another two months. Men have to be moved from department to department, depending upon schedules. A man may work in tablet manufacturing for nine months before being transferred to chemical manufacturing operations where his chemical education can be continued.

4. The acquisition of mental and physical coordination is a slow process at best, even with those men especially gifted. We have found that even after men have worked around the job for two years, only three out of five become first-rate operators in that they can simultaneously and satisfactorily carry on operations in a reaction kettle, a vacuum still, an extractor, and a filter press. To the inexperienced this would seem like an over-burden for one man, but men gifted for such work have demonstrated in the past that such operations can be carried on with ease and with no neglect to details.

It is self-evident that an apprentice program would be difficult to institute, since operations vary considerably in frequency.

Until such time as a man understands the hazards surrounding the use of chemicals and his responsibility to his fellow worker and, also, appreciates that poor work on his part may result in an intermediate of such low quality that difficulty will be experienced in all subsequent reactions, he cannot be considered a skilled operator, even though he may be able to operate stills, kettles, pumps, extractors, filters, do simple pipe fitting, and

Author

put out fires. To inculcate this feeling into any man, either with or without technical education, is entirely a matter of time and depends on how often difficulties arise because of his laxity. If emergencies arise infrequently, then he may never have the opportunity to demonstrate his ability under "fire" and, therefore, one will always be in doubt as to his ability until such time as an emergency arises.

From this brief summary, it can be concluded that all chemical processing men exert a certain amount of judgment continually in the execution of their jobs as entirely apart from a man on a drillpress. A one-year absence of more than two or three per cent. of these men constitutes a serious loss to a company, unless that company has an excess of such skilled labor. Such an excess can only be built up over a two or three year period. Because of the time that must be expended to educate a man, all jobs have to be covered by at least two men. Then, in case of sickness, no production delays are experienced due to temporary absence.

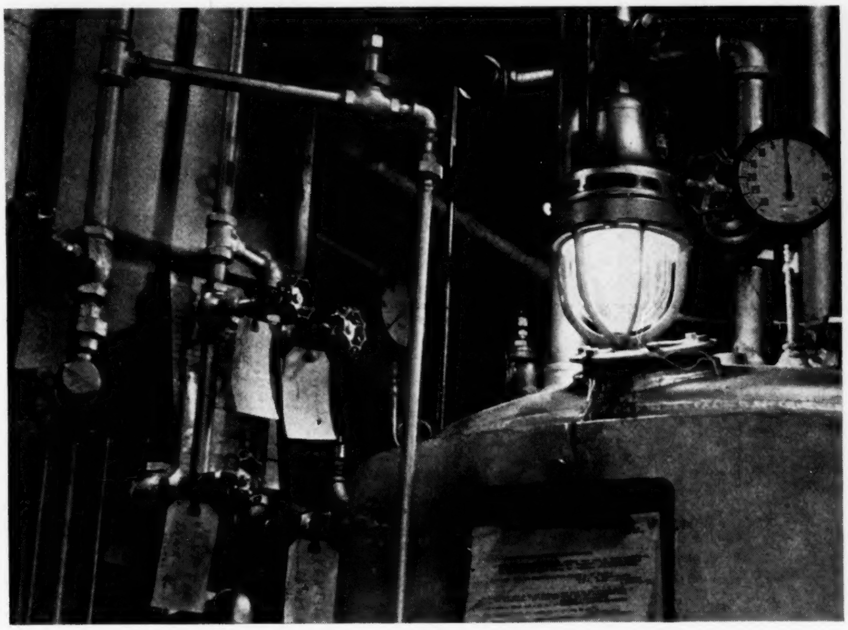
With the advent of the Selective Service Act, a very special problem faced Schering Corporation, in that 40% of the men in the Chemical Manufacturing Division were unmarried and only two or three of these men claimed dependents. These men registered in New York City, Brooklyn, Newark, Elizabeth, Unionville, Hillside, Bloomfield, Montclair, Belleville and other neighboring towns. It might be concluded that we would suffer a maximum loss of 40% of our force at one time. Such a conclusion is misleading, however, for the *distribution* of these men within the organization is the important consideration.

In one laboratory alone 100% of the men will probably be put in Class 1-A.

Since our men were registered in so many different districts, the unexpected has happened; i. e., operators and their "substitutes in case of illness" are being called for induction at the same time. On one product alone, where four men constitute the force, two have entered the service and a third has been called for physical examination. In another laboratory, where three men are partly interchangeable, two have been called for induction and a third has received notice to appear for physical examination. In a third case, where a new product is still under development, the two chemists who have been with the product since the beginning and who know all its peculiarities have been notified to appear for physical examination. These men cannot possibly convey all their knowledge and observations to a new man even over a six-month period. Both men had laboratory experience before coming to Schering and, consequently, are highly valued.

In view of the many special problems facing the chemical industry when dealing with labor, it is understandable that when the example which follows was outlined to the members of the local Boards, they experienced a little difficulty in appreciating that some employees in a chemical concern have a different value than men in the usual lines of business. Since most chemical manufacturing is done on a batch basis and equipment is operated in units, the following example is both actual and concrete:

In a single room there are three units (A,B,C), each consisting of a reaction vessel, a still, condensers, and filters. On the day shift, only one operator is assigned to each unit. It has taken at least one year to train operators A, B, and C to be able to handle acids, alkalis, and organic solvents; to be able to operate steam pumps; to read thermometers, pressure gauges, and recorders; to set flow rates, steam pressures and vacuum on stills with valves; to weigh materials; to clean filters and kettles without losses; to keep accurate records by means of batch sheets; to handle fire extinguishers in case of emergency; and finally, to be able to coordinate his efforts so that he can simultaneously carry on work in a reaction kettle, a still, and a filter. These fundamentals all first rate operators must know.



Typical of the chemical equipment requiring highly-skilled labor.

Operator A knows only the two different processes in his unit, and each reaction runs for two days. This means that A repeats his work only four times a month. Operator B knows his unit and can also cover the reactions in C's unit. Operator C has been employed for three years and knows the processes in all the kettles. Operator C is called for service by the local Board in District No. 1. He is released because his work is covered by a new man under B's supervision. Two weeks later, operator B is called for service in District No. 2. A request for deferment is asked for operator B until a new man can be given some fundamental training under operator B, while operator A learns the processes in B's unit. The request is not granted because B's salary would not indicate that he is an essential man; yet without him, all units must be shut down until the department chemist can train more men.

Local Boards must be convinced that an operator or technician who may be earning less than $35.00 per week may be a very strategic man in a particular set of operations when his absence is coupled with the absence of another man who is either his substitute in case of sickness or the "over all operator" in the department. The case of A, B, and C is a matter for special consideration, for the units can be operated now with only apprentices and a resultant personal hazard to all.

For some reason or another, the toolmaker is used as the unit for skilled labor in the offices of local Boards, and they feel that since a good toolmaker can immediately start to make any kind of tool as soon as he is given the order, so also should operator A be able to cover B's work immediately upon receiving the order to do so.

As can be concluded from the preceding remarks, our men in themselves are valuable because of their background and training, but to lose them individually may not always interfere with production. However, when two men covering the same job are called at the same time and the same thing happens in three different departments, the matter becomes very serious.

It is difficult to acquaint all the unrelated and uncoordinated local Boards with our problem, and those we have consulted seemed very surprised at the complexity of operations in the chemical field. Although willing to cooperate with us, they themselves have no guide as to what is a just decision regarding deferments, since our welfare is governed by their action combined with that of neighboring Boards.

In discussions with the local Boards, it was also noted that each had its own interpretation of "national interest," but the majority seemed to think that in order to show no partiality, no business was important enough to warrant deferments unless that company was working on defense contracts. Consequently, they could see no justice in deferring graduate chemists who were being trained for production, control, or analytical work. In reviewing the history of the last war, it is the writer's belief that if war is declared and these men are in the Army as Privates, their release back to industry for chemical production will be very dubious. The result will be that we will again experience a shortage of technical personnel in a time when they are needed most.

The Boards have probably been coerced into such ideas because most deferment requests to date have come from the individuals and not from industry.

It is the belief of the writer, after talking to men at three different local Boards, that they could use some advice from the central Washington agency on this problem of:

1. Skilled labor shortage in the chemical industry.
2. Time interval for educating new men.
3. Coordination of their activities so that no one company will experience a great shortage of trained personnel in any one year.

BUREAU OF MINES ANNOUNCES

New Magnesium Process

THE Bureau of Mines has reported to the Secretary of the Interior that it is ready to proceed with initial tests of a special process it is developing for the production of magnesium metal, vital defense material. The tests will take place at a small pilot plant just completed by the Bureau at Pullman, Wash., according to Dr. R. R. Sayers, Director.

Extensive experimentation in the laboratory by metallurgists of the Bureau on a method for the direct production of magnesium from magnesite ore has proved encouraging enough, states Doctor Sayers, to warrant trying out the process on an engineering scale.

No commercial plant in the United States, added the Director, utilizes such a process, and only three other plants in the world are reported to employ a method similar to that being developed by the Bureau.

If the operations at the Bureau's small pilot plant, which is designed to produce from 50 to 100 pounds of the metal daily by the electrothermic method, are successful, sufficient data may be made available to determine the feasibility of production on a larger or commercial scale.

The information which the Bureau of Mines has gathered to date is not sufficient to permit the design of a large producing plant or to furnish a reliable estimate of the cost of producing magnesium by the electrothermic method on a commercial scale.

Raw Materials

Magnesite ore, which the Bureau's process utilizes, is found in abundance in a number of areas throughout the United States, and some of the largest deposits, variously estimated as from three to seven million tons, are situated in the State of Washington. Brucite, dolomite and many other common minerals contain magnesium in appreciable amounts.

The Bureau of Mines realized the potentialities of magnesium metal when in 1936 it began active cooperation with the State College of Washington, at Pullman, Wash., in a solution of the problems of the principal minerals occurring in that region. To facilitate the work of the Bureau, Washington State College provided space for the Bureau's engineers and also supplied some technical assistants.

The magnesium deposits in the area were being worked for high grade magnesite which was used in refractories. In addition to this magnesite there were large reserves of low-grade mineral for which there was no immediate industrial use. A survey of the possibilities of producing magnesium metal from these deposits was made in the early part of the program, and experiments were undertaken on the preparation of anhydrous magnesium chloride which could be used in the production of the metal by the established commercial process.

The only process commercially used in this country for the production of magnesium metal involves the electrolysis of magnesium chloride in a fused salt bath. The raw material is derived from brine obtained from saline wells or sea water.

The Bureau started work on the possibilities of direct production of magnesium metal from the ore by reduction with carbon. Experiments had been made in Europe, and small plants had been built in which magnesia was reduced with carbon in an electric furnace, and the magnesium and carbon monoxide vapors chilled in an atmosphere of hydrogen to prevent reoxidation. Since hydrogen is a relatively expensive gas and large volumes are necessary to cool small volumes of magnesium metal vapor, and since hydrogen carries with it the danger of explosions, the Bureau undertook to develop a new method of chilling this vapor.

Early experiments in the laboratory at Pullman indicated that a spray of hydrocarbon oil could be substituted for the hydrogen. Laboratory tests proved encouraging. Consequently, with funds provided by the Congress a small pilot plant to carry on studies on a somewhat larger scale was constructed. At the same time a successful method was developed for the flotation of the lower-grade magnesites which enabled the Bureau's engineers to use the concentrates produced by this method in its process for production of magnesium metal.

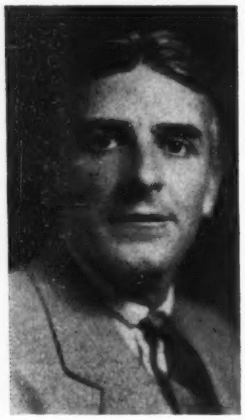
Pure magnesium is soft and has a beautiful silvery luster. It is about a third lighter than aluminum, its density being 1.74 as compared with 2.70 for aluminum. It is a metal of extremes insofar as its uses are concerned. In the form of powder or foil, it is easily ignited and burns with intense heat and light. When combined with aluminum it forms an alloy of light weight and high strength and is utilized extensively as important construction material, particularly in the aircraft industry.

Commercial production of magnesium in the United States did not begin until 1915 when the World War interrupted imports from Germany. Production which totaled 87,500 pounds in 1915 and reached 284,118 pounds in 1918, dropped off after the war. About 1925 demand for the metal gradually began to increase until sales totaled 1.434,893 pounds in 1933 then rose rapidly to reach a record peak of 12,500,000 pounds in 1940. Largely responsible for this growth was the use of magnesium-alloy structural products, the production of which climbed from 114,464 pounds in 1930 to 2,365,260 pounds in 1939.

During the World War years there were as many as five domestic producers of the metal but by 1920 only two remained. The American Magnesium Corporation discontinued production in 1927, leaving The Dow Chemical Company the sole producer of magnesium in the United States at the present time. This firm produces magnesium from magnesium chloride recovered from underground brine at Midland, Mich., and from sea water at Freeport, Texas. Recently another firm has obtained a loan from the Reconstruction Finance Corporation to construct a plant on the West Coast.

Uses of Magnesium

Almost two-thirds of the domestic magnesium is used in fabricated magnesium products; the remainder is consumed in aluminum and other alloys, metallurgical deoxidizing applications, pyrotechnics, chemicals, etc. The aircraft industry accounts for most of the structural magnesium alloy products employed, such as castings, extrusions and sheet. The trend in aircraft construction is to use even greater quantities of magnesium alloy per plane because the lightness and adequate strength of the metal reduce power consumption, increase payload, and improve performance. The engine, wheels and airframe use structural parts made of magnesium alloy. Magnesium alloy products also are used in the automobile, portable and high-speed equipment and tool, textile, electric motor, and foundry equipment industries. The use of magnesium as an alloying ingredient of aluminum, zinc and other alloys has contributed appreciably to the rapid expansion in consumption of the metal in recent years The munitions industry today also requires more magnesium to manufacture tracer bullets, star shells, flares, and certain bombs.



Shipping and Container FORUM

By R W Lahey

LOADING AND BRACING OF CALCIUM CARBIDE DRUMS—AMERICAN MANAGEMENT ASSOCIATION PROGRAM FOR APRIL—EXPLOSIVES TRANSPORTATION RULES—ALL-AMERICA PACKAGING COMPETITION

Editor's Note: This article on the Loading and Bracing of Carload Shipments of 100-Pound Calcium Carbide Drums was written by J. Carl Bode, plant superintendent, National Carbide Corporation, Keokuk, Iowa.

MANUFACTURERS in the chemical industry have devoted considerable time, effort, and money to the development of containers which are best suited to properly deliver their products to consumers. The best containers will fail, however, unless they are properly protected and braced when shipped by rail in carload lots.

The transportation of Calcium Carbide has presented its individual problems. Although various sized containers are used, by far the most common is the 100-pound size. Since the material must be protected from water, whether it be actual water or merely humidity in the air, metal seems to be the logical material for the container. As is the case with most commodities, the container is merely excess baggage and is discarded after the contents are used. Therefore, from the standpoint of cost, it should be as light as possible consistent with other requirements. Preventing such containers from becoming badly bent up brings us up to the question of proper bracing of the load in the car, for damage to the drum not only destroys its appearance, but also may open seams or puncture the drum and thereby spoil the contents due to exposure to air or water.

Prior to 1926 we employed wooden bracing for our carload shipments. This consisted of the usual method of constructing gates from 2" x 6" lumber, placed against the ends of the loads in the doorway of the car with 2" x 6" braces fastened to cleats which were spiked to the car sides and car floor. This method was unsatisfactory, as the shock of the load against the gates ripped the cleats loose and splintered the 2" x 6" braces which then permitted the drums to tumble about in the car.

A slight improvement was obtained by loading the cars in such a manner that only about 18" of empty space existed at the doorway and this space was cribbed between the 2" x 6" gates. While this reduced damage somewhat, results were still far from desirable, as the load was too rigid and we experienced trouble with mashed drums. Occasionally even the cribbing was splintered, permitting the drums to tumble about in the car.

This lumber bracing was expensive, and a sizeable crew of men was needed to do all of the fitting, sawing, and nailing necessary for each car.

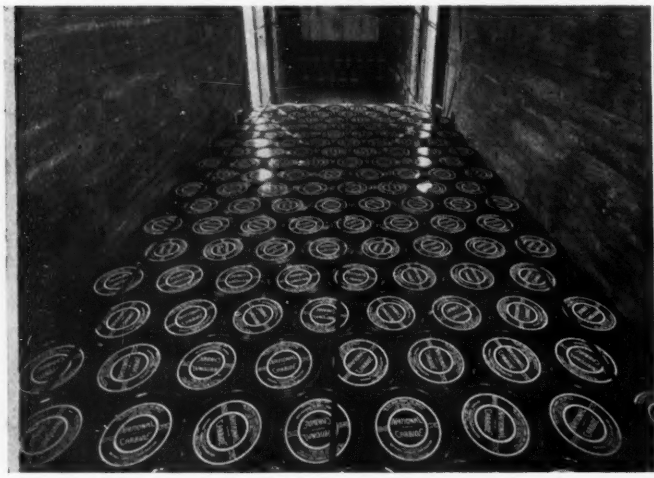
In 1926 we adopted a method of bracing the drums in the car using Acme Steel bands. This method consisted of two horizontal bands around each tier of drums. Each tier of nested drums was thereby held together as a unit, and the fact that these units were not fastened to the car gave the load sufficient flexibility to shift or slide under impact, thus preventing the tendency to crush the drums. Damage was very materially reduced, and one man could tie a car in from one-half to three-quarters of an hour. Heavier carload shipments were also made possible.

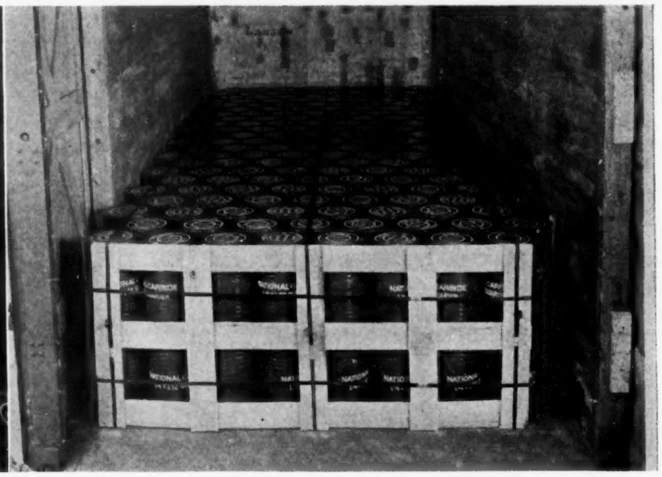
This method served quite well until the railroads started to speed up freight movements. This increase of speed resulted in rougher handling of the cars, and damages again began to creep upward. It was therefore necessary to develop a method of bracing that offered even better protection.

After considerable experimenting, the method shown by the accompanying photograph was adopted. It consists of end gates in front and back of the load, all bound with Acme Steel bands to form a unit. The whole unit is still free to move on impact, but it has cut down the tendency of one tier moving with relation to another, as was frequently the case when tiers were individually banded.

We still have occasional damage claims and may never be able to develop a method of loading that will guarantee one hundred per cent. protection. However, when one looks back to 1926, it must be admitted that great improvements have been made. We have been able to increase the load per car from a maximum of 400 drums to 1000 drums. Labor for bracing is much less, bracing material costs are less, and, what is most important, damages are far less.

Below, looking from one end of the car (left), drums in the foreground have been braced and tied down. Drums in background are in process of loading. Note draped bands in position to be tied down when loading is completed. Below (right), floating load in one end of the freight car protected by gate and side strips and strapped as a unit.





American Management Association Announces Program for April Conference

A program devoted to discussion of currently important problems in the fields of packaging, packing and shipping has been announced by the American Management Association for the Conference that it will sponsor in connection with the Eleventh Annual Packaging Exposition to be held at the Hotel Stevens, in Chicago, April 1-4.

The Association has been advised in the construction of the program by committees of executives representing nearly every important industry in the United States. The Conference is this year expected to have more than usual interest, because of packaging problems created by the defense program.

The program as so far arranged is as follows:

TUESDAY MORNING, APRIL 1

Chairman: Ray Schaeffer, Vice-President, Marshall Field & Company, Chicago, Ill.

9:30—A Case History of Informative Labeling.
Fred C. Hecht, Manager, Packaging Division, Sears, Roebuck & Co., Chicago, Ill.

10:30—The Economy of Packaging.
E. A. Throckmorton, General Manager, Sales Promotion, Container Corporation of America, Chicago, Ill.
Consumer—Mrs. W. E. Fribley, President Chicago Housewives' League, Chicago, Ill.
Manufacturer and Dealer—Speakers to be announced.

TUESDAY AFTERNOON, APRIL 1

Moderator: Ben Nash, President, Ben Nash, Inc., New York, N. Y.

2:00—How Does the Defense Program Affect Packaging?
Defense Council—D. C. Everest, President, Marathon Paper Mills Company, Rothschild, Wisc.; Special consultant to Industrial Materials Division, the Advisory Commission to the Council of National Defense, Washington, D. C.
Production Management—Dean E. Rueckert, Packaging Engineer, Swift & Co., Chicago, Ill.
Glass—Speaker to be announced.
Metal—Dr. R. W. Pilcher, Research Department, American Can Company, Maywood, Ill.
Plastics—B. F. Conner, Manager, Plastics Division, Colt's Patent Fire Arms Manufacturing Company, Hartford, Conn.
Transparent Sheeting—P. M. Gilfillan, Vice-President, Shellmar Products Company, Mt. Vernon, Ohio.
Machinery—H. H. Leonard, President, Consolidated Packaging Machinery Corporation, Buffalo, N. Y.
Shipping Containers—G. T. Henderson, Director, Packaging Laboratory, The Hinde & Dauch Paper Company, Sandusky, Ohio.

WEDNESDAY MORNING, APRIL 2

Chairman: Frederick C. Heinz, H. J. Heinz Company, Pittsburgh, Penn.

9:30—The Permeability of Fiber Containers to Water Vapor.
Warren Emley, National Bureau of Standards, U. S. Department of Commerce, Washington, D. C.

10:30—Display Value in Package Merchandising
W. L. Stensgaard, W. L. Stensgaard & Associates, Inc., Chicago, Ill.

11:30—The Necessity for a Package Testing Program.
Speaker to be announced.

LUNCHEON

1:00—How the Warring Countries Met Their Packaging Problems.
I. M. Sieff, Vice Chairman, Marks & Spencer, Ltd., London, England.

WEDNESDAY AFTERNOON, APRIL 2

Chairman: George R. Webber, Manager, Package Development Bureau, Standard Brands, Inc., Hoboken, N. J.

2:15—The Standardization of Container Capacities.
Alex Pisciotta, Chairman, Committee on Standardization of Packaged Goods, National Weights and Measures Conference, New York, N. Y.

3:00—Versatility in Gluing Mechanisms.
Dr. F. C. Campins, National Starch Products, Inc., New York, N. Y.

3:45—Manual vs. Machine Operations as Cost Factors.
E. A. McElwain, Gas Mask Plant No. 2, Johnson & Johnson, Chicago, Ill.

THURSDAY MORNING, APRIL 3

Chairman: Douglas Kirk, The Quaker Oats Company, Chicago, Ill.

9:30—Trends in the Use of Forest Products for Shipping Containers.
Ralph W. Marquis, Division of Forest Economics, U. S. Forest Service, Washington, D. C.

10:30—Packing and Shipping Specifications on Army and Navy Shipments.
A. W. Luhrs, President, Container Testing Laboratories, New York, N. Y.

11:30—Corrugated Board and Its Component Parts as Engineering Materials.
T. A. Carlson, Forest Products Laboratory, U. S. Department of Agriculture, Madison, Wis.

THURSDAY AFTERNOON, APRIL 3

Chairman: R. F. Weber, International Harvester Company, Chicago, Ill.

2:00—Shipping Container Clinic.
At this session 14 companies in as many industries will submit their shipping containers to the group attending the clinic.

Regulations for Transportation of Explosives

The Bureau of Marine Inspection and Navigation of the Department of Commerce has published regulations which have been adopted for the transportation of explosives and other dangerous articles in the January 11, 14, 15, 16, 17 and 18th issues of *Federal Register*. Copies may be obtained from the Superintendent of Documents, Government Printing Office in Washington for 10c each. These regulations become effective April 9 and it is reported that the bureau will have the complete regulations printed and ready for distribution by April 3.

The proposed regulations published several months ago, on which conferences and a hearing were held in Washington last December, have been changed in certain details as a result of facts and suggestions presented at these meetings.

All domestic and foreign vessels are subject to the regulations, except vessels carrying in bulk in tanks, inflammable or combustible liquid cargo and which are subject to R. S. 4417a.

The regulations with respect to definitions, descriptive names, shipping names, packing, marking, authorized containers, labeling and certifications of shipments of explosives or other dangerous articles or substances and combustible liquids, apply to all shippers offering such articles or substances for transportation or storage on board vessels to which the regulations apply.

Enforcement is vested primarily in the Bureau of Marine Inspection and Navigation and in the Coast Guard of the Department of the Treasury.

Export shipments may be made when packed, marked, labeled and described in accordance with the regulations of the country of destination. A bill of lading or other shipping paper shall identify such shipments by the shipping name shown in the regulations and shall name such foreign regulations.

It is understood that the bureau will hold hearings from time to time as the need develops, to consider proposals for changes.

Proposed Modifications on Regulations

The Bureau of Service, I. C. C., held an informal meeting in Washington on February 17th to discuss certain proposed modifications in the new Regulations which went into effect on January 7th last. Most of the changes were to correct errors and omissions in the printed copies of the new Regulations. In addition, the following changes of interest to the chemical industry were among those considered.

1. Additions to the commodity list Section 4.

Amyl chloride—Inflammable Liquid.
Diethylamine—Inflammable Liquid.
Nicotine sulfate, liquid—Class B Poisonous Liquid.
Oleum—Corrosive Liquid.
Nitroguanadine—High explosive.

2. In order to provide for *shipments prepared in metric weights and measures,*

(*Continued on Page 326*)

New Products and Processes

By James M. Crowe, *Assistant Editor*

AS always Du Pont research is resulting in more improved processes and products. During the past few weeks several announcements have been made which show the activity of the company's chemists. Among these developments was the process for producing paint pigments 33 per cent. more effective in hiding power. The process is described as a transformation of the crystalline structure in the minute titanium dioxide particles comprising the pigment. By altering the form of the finely ground crystals, it is possible to deflect more of the light rays striking the surface, resulting in a more opaque covering.

Also announced was the domestic synthetic production of indole, an important constituent of perfumes. This scent occurs in most natural floral odors. It is the ingredient giving natural jasmine its distinctive odor, and is an important element of lilac fragrance. As this is a very essential ingredient of practically all perfumes and as supplies from central Europe were jeopardized, a research program was initiated and led to the development of a process for synthetic production with coal and nitrogen as the raw materials.

Research in the textile field led to the introduction of four new dyes which have been designated as "Polyform" Blue RF (P.A.F.); "Diagen" Red Violet DR (Pat.); "Sulfogene" Brilliant Green 4GX Concentrated; and "Sulfogene" Brilliant Blue RCF.

"Polyform" Blue RF is a formaldehyde-aftertreated direct color. Like the other members of the group, it is of particular interest as a ground shade on viscose process rayon which is to be subsequently discharged. It is slightly greener in shade than "Polyform" Blue 2RF (P.A.F.) and therefore better suited to the production of navies. When dyed on rayon, it shows very good fastness to washing at 169° F., light, perspiration and pressing.

"Diagen" Red Violet DR is a stabilized azoic printing color suitable for application to cotton. It produces reddish shades of violet which possess good fastness to washing, power laundering with chlorine and hot pressing. Its light fastness is about equal to that of "Diagen" Bordeaux MR (Pat.).

"Sulfogene" Brilliant Green 4GX Conc. is a sulfur color which produces bright yellowish shades of green. It is similar in all its properties to the older type "Sulfogene" Brilliant Green 4GX except that it is much more soluble and is, therefore, better suited to use in circulating liquor type machines. This product is equally suitable for application to cotton rawstock, yarns or piece-goods, and because of its good fastness, it is particularly recommended for washable fabrics such as denims and ginghams, as well as awnings and upholstery materials.

"Sulfogene" Brilliant Blue RCF is a sulfur color which possesses fastness properties similar to those of "Sulfogene" Brilliant Blue 3GCF. However, it produces redder shades of blue than the older type. It is recommended for both cotton and rayon and is suitable for practically all types of machine dyeings as it levels and penetrates well. It is of interest for application on rawstock, yarns and piece-goods.

Also in the textile field three new types of "Methacrol" methacrylate resin emulsion finishing agent have been developed. "Methacrol" BE is a stiffening and bodying agent that is compatible with polyvalent metal ions and with cationic surface active agents. It is, therefore, adapted to use in finishing operations where these materials are present in high concentrations. "Methacrol" BE is substantive to wool, silk, cotton, nylon, viscose process rayon and cellulose acetate rayon. It can be applied from a dilute bath by exhaustion. The substantive property makes it particularly suitable for use on knot goods and fabrics that cannot be handled on a padder or quetsch. When used with "Zelan" A in a combination bath, it modifies the soft hand produced by the "Zelan."

"Methacrol" NH is a finish for nylon hose which imparts snag-resistance and a delustering finish. It is a stable milk-white fluid dispersion that is compatible with metallic ions, but not with soaps or other soaplike surface active agents. The finish adds body to the stockings to permit satisfactory packaging. It is durable to washing.

"Methacrol" SH is recommended for use either alone or in combination with "Aridex" WR and/or "Aridex" WP (Pat.) on silk hosiery. It has a very strong delustering effect on the fiber, being more active in this respect than "Methacrol" NH. When used with starch (or gelatin) and "Aridex," excellent water repellency and a good body are obtained. By varying the percentages of these materials, almost any desired hand can be produced.

Glass Cloth Insulation

Glass cloth, impregnated and coated with heat-resisting varnishes developed especially for this purpose, is now available for use as insulation by manufacturers of electric motors, generators and similar equipment. This new insulation material, known as Irvington Varnished Fiberglas, has been developed by the Irvington Varnish & Insulator Company.

The material consists of a woven glass cloth base (Owens-Corning Fiberglas) impregnated and coated with a special varnish which greatly increases its resistance to abrasion, impact, and increases its overall mechanical strength. The resulting material has much higher insulation resistance and ability to withstand heat, thus enabling manufacture of lighter, smaller motors for any given horsepower rating and safer operation of these motors under continued overloads.

In addition to the manufacture of standard thicknesses (.005" to .012"), widths (up to 36") and colors (black or yellow), the company is prepared to cooperate with manufacturers in developing special combinations of various Fiberglas base cloths, varying as to thickness, coating, tightness of weave, filament size, with various varnishes to produce insulations best suited to unusual individual requirements.

Opalwax

A new synthetic wax called "Opalwax," is finding application in the rubber and other industries as a substitute for Montan and other formerly imported waxes. It is comprised principally of 12-hydroxy stearin (glyceryl trihydroxystearate) produced by the catalytic hydrogenation of castor oil and combining unusual physical and chemical properties. It is practically odorless, pearl-white in color, has an apparent specific gravity of 0.98 to 0.99 at 20°C., is very hard and has an acid number of less than 2.0. "Opalwax" is extremely insoluble in the common solvents. It is dissolved with severe discoloration by concentrated sulfuric acid and is disintegrated and in part dissolved by concentrated nitric acid.

Insulating Varnish

Harvel 612-C is a phenol-formaldehyde synthetic resin-base varnish made from Cashew Nut Shell Liquid which polymerizes upon baking to an infusible-insoluble state. It is an internal drying varnish that solidifies throughout leaving no gummy half-cured interiors since it does not depend upon oxidation for its eventual solidification. The new formulation of 612-C produces a basically new varnish with improvements in speed of cure, flexibility adequate to withstand all internal stresses due to thermal expansion and

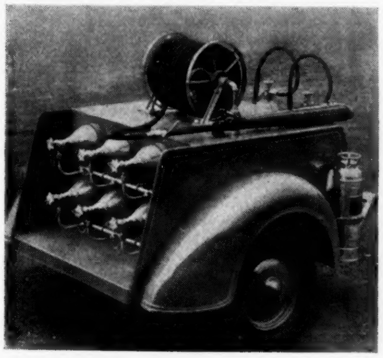
(*Continued on page 370*)

NEW EQUIPMENT

Mobile Fire Fighting Unit QC 108

A compact and versatile fire fighting weapon has recently been designed and perfected to be hooked up as a trailer for emergency use.

This mobile unit carries a heavy armament against fire. The big artillery is a battery of six 50-pound carbon dioxide cylinders equipped with a hose-reel and nozzle. The cylinders are manifolded together and are individually operated by valves on each cylinder. This permits employment of all or any part of the unit's capacity on a large or a small fire.



Carbon dioxide gas is discharged onto the fire through 100 feet of ½-inch hose, fed through a trunnion type manifold. Allowance is made for control of the discharge at the "business end" of the extinguisher, through use of a shut-off valve on the nozzle handle. This permits discharge to be interrupted while operator is maneuvering for position against a blaze.

For smaller fires, two portable carbon dioxide extinguishers of 15 pounds capacity are carried on the front platform of the trailer. Also two 2½-gallon pure-water extinguishers which operate on the principle of a syphon bottle. They contain a small cartridge of carbon dioxide which is released when the extinguisher is inverted, and which propels a water stream to an effective distance of 30 to 40 feet.

It is expected that the new trailer will be employed by industrial plant fire brigades for use as first-aid fire extinguishing equipment. Primarily, the unit is designed for use on large fires in flammable liquids and electrical equipment. Carbon dioxide is especially effective against these two types of fire.

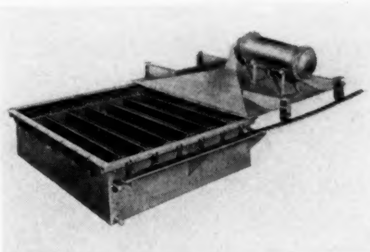
Air Powered Mixer QC 109

A maker of electrical mixing equipment for industrial application has now begun the production of a newly designed air powered unit. The main features of the new mixer permit its use as an explosion-proof unit which can be operated in presence of ordinarily serious fire hazards. It is completely enclosed and therefore suitable for use in places where splashing of material, water, or fumes may be harmful to other motors. The air motor permits a wide adjustment in speed and is suitable for operation where change of mixing speed is necessary during the mixing process. This unit is designed as a portable batch mixer for the average job in fifty- or one hundred-gallon containers.

The air motor is ball bearing, one-quarter H.P. with maximum speed of 2000 R.P.M. on 100 pounds pressure (speed is regulated by the pressure). The motor is equipped with exhaust silencer. An adjustable clamp is provided for attachment to container. Stainless steel shaft is coupled to motor through a nickel plated tube-type coupling. Four-inch diameter propeller is of nickel plated bronze.

Horizontal Still (or Dryer) and Condenser QC 110

A unique piece of special processing equipment recently designed and built is the still (or dryer) and condenser unit illustrated here.



The purpose of the operation for which this equipment was built is to remove from the surface of a great number of lacquered objects the highly volatile solvents which must be condensed and recovered as the objects are being dried. The particular design was adopted to assure processing in a closed system so as to avoid loss of volatile material and possible dangers. The still or dryer is therefore in the form of a flat rectangular welded steel tank which accommodates six smaller welded steel tanks or trays into which the objects are placed. These trays are each about 6″ square x 48″ long and are easily lowered into and lifted from the main tank. Surrounding and heating each tray is a bath of oil heated in turn under thermostatic control by steam coils running the full length on both sides of each tray. When the dryer is loaded the domed cover is slid on tracks over the top of the tank and sealed by tightening the quick-closing swing bolts.

Locating the condenser on top of the cover keeps it close to the source of vapor generation and makes for a compact unit. This design suggests a drying and solvent recovery process application on not only objects which are surface coated but also of a great many chemicals and other materials with a high percentage of solvents, assuring full recovery of the solvents and uniform drying of the remaining product.

New Cylinder Truck QC 111

This new hand truck is designed to carry an oxygen cylinder, an acetylene cylinder, and a complete welding and cutting outfit. This new truck, known as the Oxweld T-7 Two-Wheel Welding Truck, is light in weight, well balanced, and has 14-in. wheels equipped with semi-pneumatic rubber tires. The T-7 weighs considerably less than the former all steel-wheeled trucks which it replaces.

These features make the truck exceptionally easy to maneuver. It is easier

to handle over rough places than trucks with even larger-diameter wheels. The new design results in a 4½″ reduction in overall width of the truck, permitting passage through narrower openings. As an added feature, the size of the removable metal tool box, for extra blowpipes, tips, goggles, and wrenches, has been increased.

Chemical Industries
522 Fifth Ave., N. Y. City.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

QC 108 **QC 110**
QC 109 **QC 111**

Name ....

Title .... **Company** ....

Address ....

NEW CHEMICALS FOR INDUSTRY

After five years experimentation, Koroseal, the synthetic material created from limestone, coke, salt, and water, has been made into a transparent film by B. F. Goodrich Company. The film, because of its chemical inertness, flame and acid resistance, is expected to have industrial application in addition to its use for packaging and water-proofing materials.

Digest of Chemical Developments in Converting and Processing Fields

THE EXPANDING APPLICATIONS of Wetting Agents

By Dr. Samuel Lenher

E. I. du Pont de Nemours & Company

First thought of as substitutes for soap, wetting agents have enlarged their sphere of action and with continuing utility are finding places in many industrial applications. A recent meeting of the Society of Chemical Industry was devoted to this subject. To cover all phases three papers were presented: The Theory of Wetting Agents by Professor F. E. Bartell, University of Michigan, The Structure of Wetting Agent Molecules by C. R. Caryl, American Cyanamid Co. and Dr. Lenher's article, printed here because of its comprehensive list of commercial applications.

THE earliest known wetting agent, soap, has been used for centuries by civilized peoples for personal washing purposes. Until the early eighteenth century soap was the only wetting agent known, and it was used mainly as a luxury. In the eighteenth and nineteenth centuries sulfonated olive oil came into use as a wetting and dispersing agent, mainly in the dyeing of Turkey Red. Sulfated and sulfonated oils and fats, in addition to soaps, continued to be the only wetting agents used up to the time of the First World War. The principal user of these products was the textile industry, where they were used in dyeing and finishing operations. In 1916 the shortage of fats in Germany had stimulated research on substitutes for natural fats, especially for industrial purposes. The first synthetic wetting agents in this program prepared from non-fatty intermediates were the alkylated napthalene sulfonic acids and their salts, as isopropyl or isobutyl naphthalene sulfonates. These products were the first wetting agents to be used in industry outside the manufacture of textiles. Because of the war time emergency, these synthetic penetrants were introduced widely in place of soaps and sulfonated oils. After the war, with the return of more settled conditions of supply, some of the war time users of synthetic penetrants returned to the older types. However, many industries found the newer products of continuing utility, and as they became firmly established their distribution began to spread.

The introduction of wetting agents in this country was in the early twenties. As recognition of the advantages to be realized through the use of penetrating assistants in wet operations became widespread, active interest was aroused in the chemical industry to produce improved types of penetrants.

Wetting agents were sought which would avoid the limitations of soap; these limitations of soap are:—

1. Sensitivity to hard water, that is formation of insoluble calcium and magnesium soap.
2. Sensitivity to most other salts, such as iron, copper, and zinc.
3. Decomposition by acids and certain salts.
4. Presence of strong alkalies (and possibly hydrolytic alkali) in solution.
5. Presence of acid soaps in solution, which are objectionable when left on textiles (especially wool).

Research became active in the development of agents to extend the utility of soap-like products as well as to act as substitutes for soap.

In the late 1920's Bertsch prepared the sodium sulfate esters of the primary long chain alcohols of Schrauth. These fat alcohol sulfates were quickly accepted abroad and later in this country as effective wetting agents and detergents. The commercial success of the fat alcohol sulfates and a general recognition of their interesting properties was accompanied by the appearance of numerous new wetting agents.

The many chemical types of wetting agents of varying solubility, stability, and foaming power have led to the suggestion of the use of wetting agents in almost countless operations. In the present paper a compendium of established commercial uses of wetting agents has been made. The list which has been assembled includes only those uses of wetting agents which have at some time been established commercially. No impractical uses are listed and no hypothetical uses, such as are given frequently as examples in patent applications, are included. The lists have been arranged without reference to the chemical composition of any particular wetting agent, for frequently several different types are used interchangeably.

Commercial Uses of Wetting Agents

Textile Industry

Cotton and Linen Processing

Wetting of raw stock to reduce fly in carding.
Assistant in oiling of raw stock.
Kier boiling.
Penetrant for size mixtures including warp size.
Desizing assistant with several types of enzymes.
Bleaching.
Wetting out of skeins, packages, beams, warps, and chain warps.
Dyeing with all types of dyes.
Wetting agent for dyeing with inorganic salts as iron and chromium compounds.
Dispersing agent for vat and sulfur colors.
Conditioning and wet twisting.
Agent to increase absorbency of towels, face cloths, mops and cleaning cloths.
Penetrant in mercerizing caustic solutions.
Assistant in shrink setting finishing.
Penetrant in flameproof finishing compositions.

Wool Processing

Raw wool scouring.
Carbonizing assistant.
Assistant to improve neutralization after carbonizing.
Dyeing with wool colors.
Ingredient of mineral oil to improve removal from fabric.
Ingredient of fulling soap to aid rinsing.
Assistant in acid fulling.
Assistant in Vigoreaux printing.
Felting and dyeing of hat felts.
Finishing of wool to give soft hand.

Rayon Processing

Penetrating agent in viscose process rayon manufacture.
Assistant for desulfurizing rayon.
Agent to prevent crater formation in spinnerets in viscose process rayon spinning.
Penetrant for rayon size.
Dyeing with all types of colors for rayon.
Assistant for creping.
Finishing woven and knit goods.

Silk and Nylon Processing

Assistant in soaking of raw silk.
Conditioning of silk.
Assistant in degumming of silk.
Assistant in tin weighting and silicating of silk.
Dyeing silk and nylon.
Assistant for removing oil and graphite stains and kaumagraph marks.
Rewetting of splash proof hose prior to boarding.

Processing Other Fibers

Scouring and dyeing assistant for jute, straw and hair.
Preparation of straw hats for bleaching.
Feather washing.
Penetration of cellophane wrapped straws.
Dispersing agent for resins in moth-proofing compounds.

Leather Manufacture

Cleaning of leather prior to tanning.
Assistant in solvent degreasing of skins.
Wetting of glazed skins for recoloring.
Wetting back dried skins, and crusted leather.
Assistant in the bateing process.
Penetrant and leveling assistant in dyeing.
Assistant with alum or chrome and alum for white leather.
Assistant for fat liquoring of leather.
Solubilizing and dispersing agent for vegetable tanning materials.

Fur Industry

Assistant in dyeing with intermediates and oxidizing agents.
Assistant in alum tannage of skins.
Assistant in degreasing of skins with solvents.

Petroleum Industry

Penetrant in acid treatment of oil wells.
Assistant in flooding waters in recovery of petroleum from oil bearing sands.
Assistant in breaking crude oil-brine emulsions.

Paper Industry

Assistant for cooking rags.
Washing of paper and board mill felts, neutral and alkaline.
Acid washing of mill felts.
Wetting new felts and impregnating felts for easy wetting.
De-inking of paper stock.
Agent to increase absorbency of paper towels, blotting papers and facial tissue.
Assistant in beater sizing with clay and alum.
Assistant in calender sizing.
Assistant in calender coloring.
Assistant in making transparent or glassine paper.
Assistant in preparing fireproof paper.
Pitch dispersing agent in beater.

Metal Processing

Wetting agent for acid and alkaline cleaning with or without solvent emulsions, especially for enameling.
Assistant to remove drawing grease from small metal parts.
Assistant for wire drawing.
Addition to lime for drawing steel bars.
Wetting metal prior to lacquering.
Ingredient of buffing compounds.
Assistant for cleaning buffing compounds from pieces.
Wetting agent in lime bath to quench the pickle.
Assistant in pickling baths.
Assistant to give foam blanket in electrolytic pickle baths.
Emulsifying agent for coating aluminum with wax.
Ingredient of sodium silicate flux for welding rods.
Assistant for soldering flux.
Rinsing agent to remove soldering flux from radiators.
Assistant in electroplating baths; nickel, tin, copper, gold, silver.
Anti-pitting agent for bright nickel plating and bright copper plating.

Paint Industry

Ingredient of casein cold water paint.
Ingredient of lacquer emulsions, as nitrocellulose emulsions.
Wetting agent for wet sanding automobile body finishes.
Ingredient of caustic paint stripping baths.
Ingredient of lacquer to prevent blocking off of paper.
Assistant in metallized surface coatings, especially of paper.

Author

Cleaners and Cleaning Compositions

Wetting agent and detergent in the laundry industry.
Washing automobiles, busses, and railway cars.
Wetting agent for acid cleaning of bricks.
Ingredient of radiator cleaners.
Ingredient of denture cleaners.
Ingredient of shoe cleaners.
Ingredient of dry cleaning soaps.
Ingredient of dish washing compounds.
Ingredient of household alkali cleaners.
Ingredient of household ammonia.
Ingredient of glass cleaners, including eyeglasses.
Ingredient of spot removers.
Ingredient of laundry blueing.
Ingredient of sterilizing compound for dish washing.
Ingredient of paint cleaner.
Ingredient of acid porcelain cleaners.
Ingredient of milk bottle cleaners for mechanical washers.
Foaming agent for household hypochlorite bleach.
Cleaning agent for spun glass air filters.
Addition agent to soaps to give dispersion of insoluble soaps.

Agricultural Uses

Wetting agent in insecticidal and fungicidal sprays.
Ingredient of acid or alkaline fruit washing compositions, especially to remove spray residues.
Emulsifying agent in all types of sprays.

Cosmetic Industry

Emulsifying agent in lotions and creams.
Ingredient of brushless shaving cream.
Ingredient of depilatory cream.
Ingredient of hair wave lotion.
Ingredient of foaming bath salts and water softeners.
Ingredient of hair dye preparations.
Ingredient of shampoo for humans and animals.
Ingredient of bubble bath preparations.
Ingredient of dentifrices in liquid, paste and powder form.

Ceramic Industry

Wetting and dispersing agent for injection moulding mixes.
Assistant for pigment grinding with bentonite.
Ingredient of cement to improve grinding and setting.

Foaming agent to increase bulk in manufacture of
- mineral wool insulation
- bricks
- wall board
- thermal insulating cements.

Assistant in preparation of slips of refractories.

Rubber Industry

Penetrant in acid process of reclaiming rubber.
Mould lubricant for rubber articles.
Agent to prevent adhesion of milled rubber.
In latex compounding:—
(a) Wetting of insoluble fillers, as channel black, clay, whiting, and blanc fixe
(b) Incorporation of immiscible liquids in emulsion form
(c) Stabilizer for latex emulsions against mechanical or chemical action
(d) Improve impregnation characteristics of rubber latex into fabrics for coating.
Foaming agent in manufacture of sponge rubber articles.

Miscellaneous Uses

Wetting agent for pigments and dry colors.
Wetting agent in embalming fluids.
Ingredient of printing ink for offset printing.
Assistant in settling inorganic slimes.
Assistant for the control of crystal growth and formation of aggregates.
Assistant for control of thixotropy in paints.
Wetting agent with calcium chloride for laying mine dust.
Wetting agent for laying coal dust, in breaking out and handling coal.
Wetting of dust in air-conditioning systems.
Dispersing assistant for pigments in printing inks.
Assistant for preservation of green fodder.
Foaming agent in air-foam type fire extinguishers.
Wetting agent in photographic developer baths.
Ingredient of fly paper and fly killers.
Penetrant in manufacture of asphalt roofing paper.
Ingredient of lacquer printing compositions.
Wetting agent in inks, including writing inks.
Wetting and spreading agent in adhesives.
Wetting agent to prevent fogging of safety glasses.
Penetrant in wood stains.
Wetting agent in wall paper removers.
Emulsifying agent for oil and wax polishes.

Wetting Agents Improve Scouring of Wool Yarn

Anti-spattering agent for cooking fats and oils.
Emulsifying agent in salad dressing.
Assistant in the preparation of lake colors.
Assistant for stripping dyestuffs from fibers.
Wetting agent in household dye preparations.
Flotation agents as frothers, collectors or as frother-collectors for
(a) sulfide ores
(b) non-sulfide ores
phosphate rock
cement rock and limestone
talc
feldspar
gold
separation of sylvite (potassium chloride) from halite (sodium chloride) in brine solutions.
Assistant in rug shampoo.
Assistant in regenerating zeolite systems for soft milk.
Assistant in etching solution for photo-engravers.
Assistant in application to surfaces to get adherence of poured concrete.
Penetrant for creosoting liquors in wood preserving.
Wetting agent for dry powdered foods such as baby foods and cocoa.
Wetting agent in printing compositions for linoleum.
Wetting agent for tobacco leaves, especially for cigar wrapper leaf.

This list is of necessity incomplete, and should be taken as illustrative only of the multiplicity of uses of wetting agents. Broadly, wetting agents are of potential interest in all wet processing where wetting, penetrating, emulsifying, dispersing, solubilizing and cleaning are concerned. New applications of wetting agents are being investigated and the present list will be greatly expanded in the future. Certain of the listed uses are covered by patents which act as a limitation, while the greater number of uses mentioned are free of restrictions. This paper has considered the uses of wetting agents in aqueous systems; the field of wetting agents and surface active compounds in organic solutions has received little attention, and is a fruitful field for the future.

The field of wetting agents is one which has grown in fifteen years in this country to a place of importance in organic chemical manufacture and in industry generally. It was thought in the early days of wetting agents and synthetic detergents that they would replace soap in many uses. The wetting agents developed up to this time have been soap substitutes to a limited extent, but their largest uses have been in the fields where soaps are not used or where soaps cannot be used. As wetting out and penetration is one of the characteristics of the detergent action of soap, the earliest known wetting agent is still the most important. However, the newer wetting agents and those of the future can be expected to gain in utility and importance as their efficiency is increased and as improved chemical types are found.

Shipping and Container Forum

(Continued from page 319)

the following addition to Section No. 26 was proposed:

When quantity limitations are specified in these Regulations by U. S. Liquid Measure or by avoirdupois weight it is authorized that quantities measured by the Metric System may be substituted, up to but not exceeding 1 gallon for liquids and 10 pounds for solids, on the basis of 1 liter per quart specified and 500 grams per pound specified.

3. A change in Section 31, footnote 6, is designed to allow the optional use of fusion welded tank car tanks for chlorine shipments.

4. To provide for *export shipments of gasoline* when moved to seaboard in carload or truckload quantities the single trip 55 gallon ICC-17E metal drum with maximum opening of 2.3" is proposed for single trip export shipments only.

5. Another request for change (Section 110-(b) (7)) covers *inflammable liquids flashing between 20° and 80° F. packed in 5 gallon cans* in fiberboard shipping containers. Present Regulations allow the shipment of one 5 gallon square can in an I.C.C.-12E fiberboard box and the change provides for two 5 gallon cans in the same type shipping container. A corresponding change is proposed in I.C.C. Spec. 12E to increase the gross weight of the packed container to 110 pounds from 65 pounds. This box is the Gaylord container which has flanged bodies and flanged heads interfolded and sealed with flat band steel strapping.

6. It is proposed to add to the containers approved for the shipment of *amorphous red phosphorus* the I.C.C. 6A and 6B returnable steel drum and the I.C.C. 37D single trip metal drum containing a maximum gross weight of not over 160 pounds.

7. It has been requested that shipment of *Formic acid* in I.C.C. 10A tight wooden barrels or kegs lined with rubber latex be authorized. This container may now be used for shipments of Formic acid when lined with asphalt.

8. It is proposed to change Paragraph 5-(b) of *I.C.C. drum specification 37H* to increase the maximum size of welded side seam drums from 30 gallons to 38 gallons. This drum is the single trip steel drum authorized for the shipment of Class B poisonous solids.

As soon as the Commission has arrived at a decision on these proposed changes, those which are approved, will be published.

All-America Package Competition

More than 30,000 items ranging from delicious mince meat packaged in transparent bags to window displays, and vacuum cleaners neatly stowed away in shipping containers, are featured in the 1940 All-America Package Competition sponsored by *Modern Packaging* Magazine in the Chanin Bldg., N. Y. City. This is the 10th annual All-America Competition and this year it has the distinction of being the only national competition devoted to the past year's progress in packaging.

On Thursday, January 9, entries were judged on the basis of protection to the product, convenience, saleability, adaptability, and good design. All of the prize winners will be announced in the March 1941 issue of *Modern Packaging* Magazine.

Entries were made under 20 classifications: (1) folding cartons, (2) collapsible tubes, (3) fibre cans, (4) glass containers, (5) metal containers, (6) set-up paper boxes, (7) plastic containers, (8) machinery and equipment class A, (9) machinery and equipment class B, (10) counter or shelf displays, (11) floor displays, (12) window displays, (13) shipping containers, (14) family group, (15) wraps, bags and envelopes opaque, (16) wraps, bags and envelopes transparent, (17) labels and seals, (18) closures, (19) rigid transparent containers other than glass, and (20) miscellaneous.

Highlights in the Competition showed a definite trend toward a wider use of transparencies of all types. Emphasis upon simplification of form and design in all types of packages from set-up paper boxes to tin cans and shipping cartons is evident on all sides. The garish, blatant design motifs and strong colors are giving way to neat and smart looking packages decorated in colors that are inspiring and pleasant to look at, at all times.

Square milk bottles made of light weight glass promise to give the paper containers some keen competition. Labels for standard cans and bottles as well as lithographed metal containers are becoming more and more informative with recipes, ingredients, directions for use and other useful data accompanying natural color reproductions of the package's contents.

The All-America Package Competition was judged by Barbara Daly Anderson, director of Parent's Magazine Consumer Service Bureau; William M. Bristol, Jr., vice-president of the Bristol-Meyers Company and president of the Packaging Institute, Henry Dreyfuss, well-known industrial designer; James M. Mathes, president of one of the country's largest advertising agencies; and George R. Webber, who is in charge of all pack-

(Continued on page 370)

CHEMICAL SPECIALTIES

Heetfield Photograph.

Photographed against the background which was the inspiration for the product's name, Old Mission Dry Cleaner is packaged in cone top cans of Phoenix Metal Cap Company, Chicago. Label is handsomely lithographed.

INDUSTRIAL · HOUSEHOLD · AGRICULTURAL

SOLVENTS for ADHESIVES

By Ralph K. Strong
Professor of Chemical Engineering
Rose Polytechnic Institute

and

Kenneth Tator
Chemical Engineer

Solvents play an important role in the formulation of adhesives. Authors first discuss in detail the various functions of solvents and review the more important ones used in the manufacture of industrial and household adhesives.

ADHESIVES are compositions which are used for the temporary or permanent bonding together of two surfaces. They may be classified into two major divisions, depending upon the uses, thus:

1. Adhesives for bonding rigid surfaces.
2. Adhesives for bonding flexible surfaces.

Each of these divisions may be subdivided into:

(a) Adhesives to provide a temporary bond.
(b) Adhesives to provide a permanent bond.

(1) *Adhesives for bonding rigid surfaces.* As examples of the bonding of rigid surfaces, such surfaces as metal, glass, porcelain, or wood may be cited. Due to the rigidity of either or both surfaces it is apparent that the adhesives used for this bonding need possess no high degree of flexibility. Therefore, bonds which are hard and even relatively brittle may be used. If, however, the cemented surfaces are of dissimilar materials it is well to have a bond not utterly lacking in distensibility and resiliency as climatic variations, such as temperature and humidity, may cause unequal expansion of the two bonded surfaces, and tend to shear the bond at the surface of greater expansion.

(2) *Adhesives for bonding flexible surfaces.* For bonding flexible surfaces it is desirable that the adhesives used should possess at least as high a degree of flexibility as the less flexible of the bonded surfaces. Examples of such flexible surfaces are paper, leather, cloth and fabrics, and flexible rubber.

(a) *Adhesives to provide a temporary bond.* Adhesives are frequently used to provide a cementing of surfaces for only a brief time, until more permanent means of bonding can be accomplished. Thus, in the fabrication of shoes, adhesives are used as a temporary bond for leather to leather, or for leather to cloth, until a subsequent stitching operation permanently unites these surfaces. Similarly, adhesives are used in book-binding in order to hold pages together until the permanent fastening by stitching or covering is applied. Adhesives for this purpose obviously need not retain their adhesive or bonding qualities for long periods of time, and it is therefore possible to use in their composition materials which become altered or valueless with age. Thus rosin, which slowly and adversely affects the aging qualities of rubber, may be used to impart "tack," or stickiness to rubber adhesives. Hygroscopic flexibilizing agents may be used in water soluble adhesive bases, and relatively non-stable or volatile plasticizers may be used in connection with adhesives of synthetic or natural plastic bases.

(b) *Adhesives to provide a permanent bond.* In the composition of adhesives that are to be used for permanent bonding the adhesive bonding strength should be maintained for a long period of time. It is important, therefore, that all materials used in these compositions be permanent and stable, so that the adhesive bond as a whole will undergo no alteration with age.

Types of Adhesive Bases

Adhesive bases are of three general types, namely:

1. Adhesives unextended by volatile medium.
2. Adhesives utilizing a water medium.
3. Adhesives utilizing an organic solvent medium.

1. *Adhesives unextended by volatile medium.* This class of adhesives may be represented by adhesive wax, adhesive tape, or sealing wax. These bases possess in themselves sufficient tackiness to cause adhesion without the use of fugitive plasticizers or mediums. Such adhesives usually employ as a base some thermoplastic material, and hence the application of heat is advantageous. This type is principally used in order to provide a temporary bond, as in most cases there is nothing in their formulation to cause a strengthening of bond after application, such as is found in other types of adhesives. Adhesive bases which are thermoplastic will, it is true, be stronger after cooling than at the time of their warm application, but do not develop an increase of strength of bond after cooling. Such adhesives as contain either shellac along with an acidic substance, or rosin with an alkaline earth oxide will, by chemical reaction, slowly increase in strength with the passage of time.

2. *Adhesives utilizing a water medium.* Adhesives which are water soluble or water dispersible, and commonly used in a water medium are represented by starch, flour, dextrin, and glucose pastes; cements utilizing natural water-soluble gums, such as gum arabic and gum tragacanth, as a base; fish and animal glues; casein glues; sodium silicate adhesives; and rubber latex cements.

These adhesives are very important, and are principally used in the bonding of rigid surfaces. For this purpose most of them serve well as permanent bonds when not exposed to water or high humidity, although casein glues and certain modifications of others in the group possess good resistance to water. Unless highly flexibilized they are not particularly satisfactory for the bonding of flexible surfaces, with the possible exception of

starch, flour, dextrin and glucose pastes. These four pastes possess good flexibility when freshly applied, but with the passage of time they ultimately become hard and brittle.

Adhesives utilizing a water medium, as well as those adhesives which utilize an organic solvent medium, attain their greatest strength of bond only after the medium, either water or solvent, has been completely evaporated, or otherwise dissipated.

2. *Adhesives utilizing an organic solvent medium.* Adhesive bases, which are soluble in organic solvents, are: rubber cements; nitrocellulose and cellulose acetate adhesives; adhesives having as a base tars, pitches, or balsams; and adhesives having various synthetic or natural plastics as the basic bonding materials. In some special applications ordinary paints are used as adhesives, notably, for cementing canvas to small boat decks and hulls. Another paper by the present authors, "Solvents in the Paint, Varnish, Lacquer and Enamel Industries," will discuss this matter.

In some applications, notably the cementing of folds of some transparent wrapping materials, certain organic solvents are used alone for sealing. In these cases the solvent functions by softening the surfaces to such an extent that pressure and subsequent evaporation of the solvent will cause the two surfaces to coalesce into a homogeneous bond.

In general those adhesives which are soluble in organic solvents will provide permanent adhesion, unless ingredients are used in their composition which cause a deterioration of the bond with age. The bonding ingredients represent a considerable range of flexibility, from rubber to the harder synthetic and natural resins.

As a class, by the selection of suitable bases, adhesives of this type may be used for either rigid or flexible surfaces.

Mechanism by which Cementing of Surfaces Is Accomplished

There are three general mechanisms by which the cementing of surfaces is accomplished, namely:

(a) By tackiness of the dry adhesive base.
(b) By chemical reaction.
(c) By evaporation of the volatile medium.

(a) *By tackiness of the dry adhesive base.* Many adhesive bases, notably unvulcanized rubber, pitches, and balsams, possess sufficient surface tackiness to serve as adhesives. In adhesives utilizing this mechanism both of the surfaces to be cemented are usually coated with a thin layer of the adhesive base, and the two surfaces then pressed together. The inherent tackiness of the adhesive films causes them to coalesce under pressure to form a homogeneous bond. In many cases heat is applied during this pressing operation in order to increase the speed of coalescence, in order to increase the penetration of the bonding material into the pores or fibers of the surface, and in order to develop in certain bases, such as tars, some pitches, and natural and synthetic thermoplastic resins, sufficient surface tackiness. In the cementing of surfaces by this mechanism plasticizers are often incorporated into the adhesive base in order to increase the tackiness of the adhesive.

(b) *By chemical reaction.* Casein waterproof glues and some sodium silicate adhesives develop their strong adhesive qualities and resistance to atmospheric variations by a chemical reaction between the adhesive base and a previously added metallic salt, usually accompanied by an absorption of water in the process. By chemical reaction also, shellac, when used in an adhesive base, will "cure," and thus produce a stronger and more inert bond if acidic substances are also present. Rosin as a base will act similarly by chemical reaction with metallic oxides. Self-vulcanizing cement is another example of this mechanism of cementing.

(c) *By evaporation of the volatile medium.* Most adhesive compositions may be utilized by this mechanism. The adhesive is spread in a thin, fluid film upon one or both of the surfaces to be cemented, and then the two surfaces are brought into contact. Upon subsequent diffusion and evaporation of the medium, whether water or an organic solvent, the adhesive base remains and effectively bonds the two surfaces. This mechanism is the usual one with starch, flour, dextrin, glucose and glucose pastes; fish and animal glues; natural and synthetic resin bases; cellulose ester adhesives; and paints. Other adhesive bases, with the exception of casein glues, may also be used for cementing by this mechanism, by their prior solution or dispersion in a volatile medium.

Solvents find many and varied uses in the adhesives industry, whether the adhesive medium is water or other solvent, and even when no medium is demanded. The principal functions performed by solvents are the following, namely:

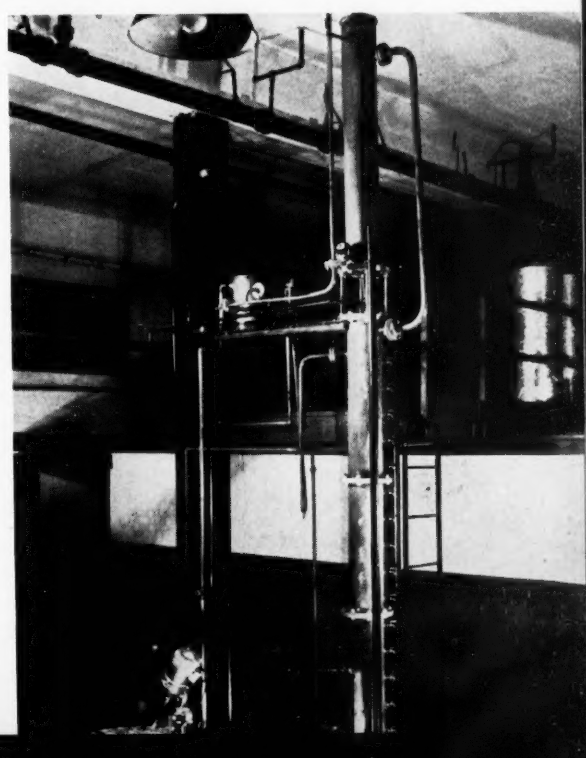
1. As volatile mediums.
2. As flexibilizers and plasticizers.
3. As thinners.
4. As blending agents.
5. As cleaning agents.
6. In incidental functions.

1. *As volatile mediums.* With the exception of occasional sealing compositions, such as adhesive tapes, and certain cements, adhesive bases must be converted into liquid form for ease of application and for development of bonding strength. In the case of sealing wax the wax must be melted for application and develops its strength upon cooling. In most other sealing compositions liquefaction is secured by dissolving or dispersing the base in a suitable liquid. The liquid must be volatile, so that evaporation after application will permit the development of the full strength of the bond. Water, of course, is selected as a medium for those adhesive bases which can be dissolved or dispersed in water. A great majority of the adhesive bases are more or less water resistant, and most of these must be dissolved in a suitable organic solvent. The solvent selected should be a solvent for all of the components of the adhesive base, and should have such evaporation characteristics as the particular application demands. Also, the solvent must be chemically inert to the components of the adhesive, as well as to the surfaces which the adhesive is required to cement.

Solvent a Diluent for Base

The solvent medium serves another important function in addition to being a carrier for the adhesive base. It serves as a diluent for the base, and as such enables the adhesive to be spread out uniformly in a thin continuous film over the surfaces to be cemented. Without this extending action, unnecessary excess of adhesive may be used, and the resulting adhesive coating may be non-uniform in continuity and thickness. The heavy and irregular deposits of common sealing wax illustrate the application of an adhesive without the benefit of an extending diluent. In the cementing of surfaces which are either fibrous, or pervious, the conversion of the adhesive base into a fluid results in a stronger adhesion, obtained by a better contact of the surfaces due to the penetration of the adhesive into these surfaces. It has been found that the penetrability of various solvents is not alike, and that where such penetration is desired the solvent should be carefully selected in regard to this property.

Below, a batch still and fractionating column in the chemical engineering laboratory at Rose Polytechnic Institute, Terre Haute, Ind.



In the selection of a solvent medium, the ideal solvent for a specific purpose may not be found in a single liquid, and it is often necessary to use a mixed solvent. For example, small amounts of ethyl ether are sometimes added to alcohol in order to increase the solvent power of the alcohol toward certain harder natural resin base constituents. Similarly ketones and esters are often used with alcohols to provide a more effective solvent for cellulose esters at an economical price. Mixtures of solvents are frequently used to adjust the evaporation characteristics, for example, butyl alcohol to retard the evaporation of an ethyl alcohol medium. For raising the flash point of an adhesive composition chlorinated solvents are commonly used with mediums of an inflammable nature. Finally, relatively cheap hydrocarbon solvents, even though they are inflammable are sometimes used to replace a portion of more active but more expensive solvents.

2. *As Flexibilizers and Plasticizers.* Most of the water soluble adhesive bases, notably glue, dry to give very hard, stiff, and in most cases, brittle films. It is usually desirable to impart some flexibility to these films, especially when they are to be used for the bonding of flexible surfaces, or where the bonded rigid surfaces might be subjected to considerable shearing force. Water soluble organic liquids are commonly used to impart this flexibility. Glycerine, ethylene glycol, and diethylene glycol, are commonly used for this purpose. The common adhesive bases, using organic solvents, require no plasticizer or flexibilizer when they are used for the bonding of rigid surfaces, but adhesive bases of some cellulose esters, or of some of the harder natural and synthetic plastics are possible exceptions, as these may be too friable to maintain their bond under shock or strain. Other adhesive bases possess sufficient resiliency to absorb without loss of adherence the usual shearing stresses exerted upon the surfaces.

When used for the cementing of flexible surfaces, all of these bases, with the possible exception of rubber and the various balsams, generally require the incorporation of a flexibilizer.

Flexibilizing and plasticizing agents, which are usually non-volatile solvents for these materials, are commonly mixed with adhesive bases in quantities sufficient to produce the desired physical properties. The more volatile solvents are sometimes used to impart temporary flexibility or plasticity, or to impart "tack" or stickiness, to the adhesive base while the surfaces are being cemented. Such solvents are sometimes used, especially where the surfaces are being cemented under pressure, to provide a temporary increase in plasticity of the adhesive base, so that an interlocking of the adhesive bond into the surfaces is obtained by penetration of the base into pores or fibres of the surface.

3. *As Thinners.* In many compositions, especially those utilizing as a major portion of the base the cellulose esters, the harder natural resins, and many of the synthetic resins, the only suitable solvents for these materials are relatively expensive. It is generally true that the volume of solvent necessary to reduce the adhesive composition to a consistency best suited for application is far in excess of the volume of solvent needed to dissolve the adhesive base. It is, therefore, often desirable from the standpoint of economy to dissolve the base in the required solvent and to thin the resulting solution to the proper consistency for application with a cheaper diluent or thinner. As the cheapest solvents are the petroleum and coal tar hydrocarbons these are most commonly used as diluents or thinners. Because of their lack of solvent action upon the adhesive base it is necessary that they should not be added in a proportion sufficiently high to precipitate any portion of the base from the more active solvent, and they should possess sufficient compatibility with the active solvent to permit the greatest possible replacement of the latter. The coal tar hydrocarbons possess this compatibility to a greater extent than the petroleum hydrocarbons. The higher compatibility of coal tar hydrocarbons over petroleum hydrocarbons does much to offset any advantage the petroleum hydrocarbons possess in the matter of price.

4. *As Blending Agents.* In the formulation of various compositions it is sometimes desirable to blend or homogenize otherwise immiscible or incompatible ingredients. Thus, it may be desirable to incorporate small quantities of water into an adhesive having an organic solvent medium, or it may be that materials that are incompatible with each other, or that are blended only with difficulty, may be required in order to obtain the proper adhesive base. To accomplish such homogenizing or blending effects, blending agents are commonly used. For this season such solvents as cyclohexanol, butyl and amyl alcohols, butyl acetate, and ethylene glycol ethers and their derivatives are commonly encountered in formulas for adhesives.

5. *As Cleaning Agents.* Many solvents that are used in adhesive compositions serve also an important secondary function, namely, that of cleaning the surfaces to be cemented, so that adequate adhesion or penetration of the surfaces may be obtained. For this function they should possess the power of softening or dissolving grease and oil films which might restrict proper adhesion. When required, small amounts of solvents, such as toluol or solvent naphtha, are added to specifically serve this purpose. This is especially true in the case of water base adhesives. Cleaning solvent is almost always contained in solvent base adhesives.

6. *In Incidental Functions.* Solvents are frequently used in adhesive formulations for reasons quite unassociated with their solvent power. Thus we find that small quantities of such solvents as pine oil and terpineol are sometimes incorporated as odorants. Likewise small quantities of pine oil are included to exert a preservative action upon wood surfaces which are being bonded. Small proportions of volatile solvents, such as alcohol, are included in dry casein and glue preparations in order that their volatilization into the void spaces of the confining container will create a sterile atmosphere in which micro-organisms cannot survive. Volatile organic solvents are often found comprising a portion of the water medium in water soluble adhesives in order to decrease the drying time of these compositions.

Special characteristics of certain solvents are particularly valuable in the industry. The polymerizing action of turpentine, terpineol, and pine oil upon rubber have made these solvents useful ingredients in rubber cement wherever the deposited rubber film is desired to be of a soft and sticky nature. The alcohols of lower molecular weight have been found to act as very effective viscosity reducing agents for rubber cement. Solvents, such as turpentine, which may develop acidity, have been found useful in compositions utilizing shellac as part of the base. In this case the acidity that is developed accelerates the "curing" of the shellac, thus rendering it harder and more inert.

List of Solvents Used in Adhesives, and Their Applications

Acetone. Solvent for cellulose esters, natural resins, and many synthetic resins. Because of its diversity of solvent power it is valuable as a solvent where a combination of base types is employed. A viscosity reducing agent for rubber cement. Used as co-solvent for cellulose ester adhesive bases with alcohols, esters, and ethers. Used as a solvent medium, either alone or with alcohol for purposes of economy, for many natural and synthetic resin bases.

Acetone Oil. Used in small quantities in various adhesives as an odorant. Used in some applications as a cheap substitute for acetone.

Amyl Acetate. Solvent for nitrocellulose and many natural and synthetic resins. Used in solvent combinations to retard the evaporation rate of low boiling solvents. Principally used in the formulation of nitrocellulose base adhesives, usually in conjunction with low boiling

solvents, such as acetone, methyl alcohol, or ethyl alcohol.

Benzol. Used as a solvent medium for bases comprised of various rubbers, pitches, or asphalt, and as a cheap thinner for more expensive solvents.

Benzyl Alcohol. A high boiling solvent having a temporary plasticizing effect upon the base. Also used in order to retard the evaporation rate of the solvent vehicle.

Butyl Acetate. Used as a co-solvent for nitrocellulose base adhesives in combination with solvents from the alcohol, ketone, or ether groups.

Butyl Alcohol. Useful in retarding the evaporation rate of more volatile solvents, and one of the best blending agents to promote compatibility of otherwise immiscible components.

Carbon Bisulfide. Highly volatile, inflammable, and poisonous solvent used to increase the solvent power of hydrocarbon solvents for rubber, asphalt, waxes, and many natural resins.

Carbon Tetrachloride. Solvent for rubber, wax, and resin base adhesives. Useful in raising the flash point of inflammable solvents.

Chloroform. Used as a highly volatile solvent for rubber, natural resins, and asphalt.

Diacetone Alcohol. Used as a fugitive plasticizer for cellulose acetate base adhesives.

Diethylene Glycol (mono-)Butyl Ether. Solvent or softening agent for nitrocellulose. Blending agent for promoting the compatibility of otherwise immiscible materials.

Diethylene Oxide. Used as a solvent and softening agent for cellulose ester adhesives, usually in combination with more volatile solvents, such as acetone or ethyl alcohol.

Ethyl Acetate. Used in nitrocellulose adhesives along with such other solvents as alcohols, esters, and ketones. Suitable as solvent vehicle for shellac, and some synthetic resin bases.

Ethyl Alcohol. One of the most useful adhesive solvents. Serves as a cheap solvent for natural resin bases, including shellac. In combination with alcohols, ketones, ethers, or esters, widely used in cellulose ester bases. Valuable blending agent to promote compatibility of otherwise immiscible material. Used in water base adhesives in order to decrease the drying time. Small amounts are incorporated in dry casein glues in order to create a sterile atmosphere. Viscosity reducing agent for rubber cement.

Ethylene Dichloride. Produces rubber solutions which resist thinning to a greater extent than any other chlorinated hydrocarbon solvent. Used in combination with esters and alcohols as a solvent and swelling agent for cellulose acetate.

Ethylene Glycol (mono-)Ethyl Ether. Used as a blending agent. Increases penetration of the adhesive into fibrous and pervious surfaces. Used alone for glyceryl phthalate resin, and with lactic acid for nitrocellulose adhesives.

Ethylene Glycol (mono-)Methyl Ether. Solvent for cellulose esters, rosin and shellac, and many natural and synthetic resins. Used as a blending agent. Increases penetration of the adhesive into fibrous or otherwise pervious surfaces. Used in combination with ketones, esters, and alcohols as a solvent medium for cellulose ester adhesives.

Ethylene Glycol (mono)-Ethyl Ether (mono)-Acetate. With acetone is an excellent solvent for cellulose acetate, and for nitrocellulose.

Ethyl Ether. Highly volatile, and inflammable solvent. Small proportions are used in combination with other solvents in order to increase their solvent power.

Ethyl Lactate. Slow evaporating solvent used to impart temporary plasticity to the adhesive base. Used as solvent for nitrocellulose in combination with low boiling solvents from the alcohol and ester groups; and in connection with water base adhesives as a blending and cleaning agent.

Gasolene. Used as a solvent vehicle for such bases as rubber, asphalt and pitch.

Kerosene. Solvent medium for cheap bituminous cements in which asphalt is the adhesive base.

Methyl Acetate. May be used to replace acetone. Mixtures with methyl alcohol or acetone are useful in reducing the viscosity of rubber cement. Used in combination with ester, ketone, or other solvents as a solvent medium for cellulose ester adhesives.

Methyl Acetone. Solvent for cellulose ethers, rubber, ester gum and many resins. Used as solvent medium for cellulose ester adhesives.

Methyl Alcohol. Most potent viscosity reducing agent for rubber cement. May be used to replace ethyl alcohol for most solvent purposes. Used as solvent vehicle for many natural resins, including shellac. In combination with ketones, ethers, and other alcohols used as a solvent medium for cellulose ester adhesives.

Methyl Ethyl Ketone. May be used as a less volatile substitute for acetone. Used as solvent medium in combination with more volatile alcohols or esters for nitrocellulose adhesives.

Naphtha, Petroleum or Solvent. Used as solvent medium for many adhesive bases which are dissolved by it, such as rubber, pitch and asphalt. Used as a cheap thinner for more expensive solvents. May be used in small quantities in water base adhesives as cleaning agent. Used in small quantities in casein adhesives in order to create a sterile atmosphere.

Nitroparaffins. Nitroparaffins are good solvents for film-forming binders that require organic solvents, for example, nitrocellulose, cellulose acetate and other cellulose esters, ethyl and benzyl cellulose. The odor of nitroparaffins in this connection is less persistent, and to some persons less objectionable than some other materials of equivalent solvent power. The toxicity is low, being of the same order as that for hydrocarbons of similar volatility.

Pine Oil. Used as an adhesives odorant. Has disinfectant and preservative properties toward wood. Used as a slowly volatile plasticizer, and in connection with shellac base adhesives, as accelerator in the curing of the shellac.

Terpineol. Used as an adhesives odorant. Has disinfectant and preservative properties toward wood. Used as a slowly volatile plasticizer, and, in connection with shellac base adhesives, as accelerator in the curing of the shellac. Rubber that is precipitated from solutions in which terpineol is present is depolymerized to form a viscous and sticky film.

Toluol. Powerful rubber solvent. One of the most widely used cheapening thinners for cellulose ester and resin base adhesives. Has some use in water base adhesives, both as a cleaning agent and in order to modify the evaporation characteristics.

Turpentine. May be used as a depolymerizing solvent in rubber cement. In connection with shellac base adhesives serves as an accelerator in the curing of the shellac.

Xylol. Cheap thinner for cellulose ester adhesives. In connection with rubber cement acts as a depolymerizing agent.

Below, a triple effect evaporator with salt separator in operation at the chemical engineering laboratory of Rose Polytechnic.

CHEMICAL SPECIALTY

News!

N.A.I.D.M. June Meeting in Chicago Conflicts With Toilet Goods Association Convention in New York—National Oil Products Opens Cedartown Addition—Glyco Opens Brooklyn Plant—Personal Items

The National Association of Insecticide and Disinfectant Manufacturers, Inc., N. Y. City, announced recently that there is a conflict between the dates of the association's Chicago meeting, June 9 and 10, and the meeting of the Toilet Goods Association in N. Y. City.

After taking up the matter with TGA officials, it was found that it was not convenient for them to change the dates. Those companies who must be represented at both meetings should make the necessary arrangements, it was suggested.

Nopco's Southern Addition

A two-story addition to the Cedartown, Georgia, plant of National Oil Products has been completed and manufacturing operations are under way, according to an announcement by Charles P. Gulick, president and chairman of the board.

New building, an addition to the Metasap division of the company, will serve to concentrate manufacturing facilities for metallic soaps and allied products in Cedartown. It is understood that further expansions are planned for the immediate future.

Ralph Wechsler, treasurer of the company returned recently from an 8-day inspection tour of the plant and reported complete satisfaction on the progress of new production facilities of the unit.

Glyco Opens New Plant

Glyco Products, is now located at 230 King st., Brooklyn, N. Y., it was announced recently. Telephone number is Main 4-1760.

New building, constructed from the company's own specifications has greatly improved shipping means, it was said, such as railroad sidings and water freight facilities. New equipment has been installed to increase and improve production facilities.

Duratex Moves to N. J.

Duratex Chemical Corp., for many years a New York manufacturer, moved recently to Hackettstown, N. J. after being incorporated as a New Jersey corporation following re-organization proceedings. The plant will manufacture a special moth-proofing compound to be used in the processing of textile products.

Offers New Cleaner

A new cleaning compound, "Dhobi," will be put on the market about March 15 by National Cleaning Products, Columbus, Ohio, according to an announcement made by its president, Jack Hackman. Packaged in one-pound containers, cleaner is manufactured in powder form and is used as a washing preparation for abrasives and for polishing metals.

Packaging Institute April 1

Semi-annual dinner meeting of Packaging Institute, Inc., will be held April 1 at Stevens, Chicago, on the opening day of the Packaging Conference and Exposition, it has been announced. E. A. Throckmorton, Container Corp., heads committee of arrangements.

Warwick Chemical Appoints

Dr. Paul Fabian for many years manager of the Uncas Finishing Company, Mechanicsville, Conn.; and for the last two years manager of the United Merchant's Arkwright Plant, Fall River, Mass., has joined the technical sales staff of Warwick Chemical as New England sales technician.

Anthony F. Costello, for a number of years salesman and technical demonstrator for Warwick Chemical in New England, has been appointed Textile Sales Manager for that territory.

Personal Items

John Powell, treasurer, National Association of Insecticide and Disinfectant Manufacturers, was operated on for serious hernia Feb. 28 at Mountainside Hospital, Montclair, N. J. Latest reports indicate that he is doing well.

A staff luncheon in honor of William Schlesinger was held by Legrand Chemical Corp., Brooklyn, Feb. 22. Louis Ortese, sales manager, presented "Big Bill" with a wrist watch in appreciation of 5 years selling activity.

Gilbert C. Lee, 60, president of the Insto Company, died recently in Los Angeles. He founded the soap manufacturing concern 15 years ago and was an inventor holding many patents on improvements in machinery.

Chemical Specialty Company

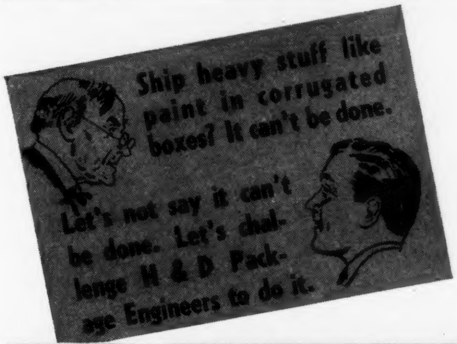
Absorene Company, St. Louis, this year celebrates its 50th anniversary it was announced by H. R. Henderson who started the company in 1891 and is still its active head. Company manufactures Absorene, wall paper and shade cleaner, HRH paint and household cleaner and Abso crystals.

Equipment was being assembled last month for the new tobacco insecticide plant of Agricultural Products Laboratories Inc., New Bern, N. C., scheduled to open soon.

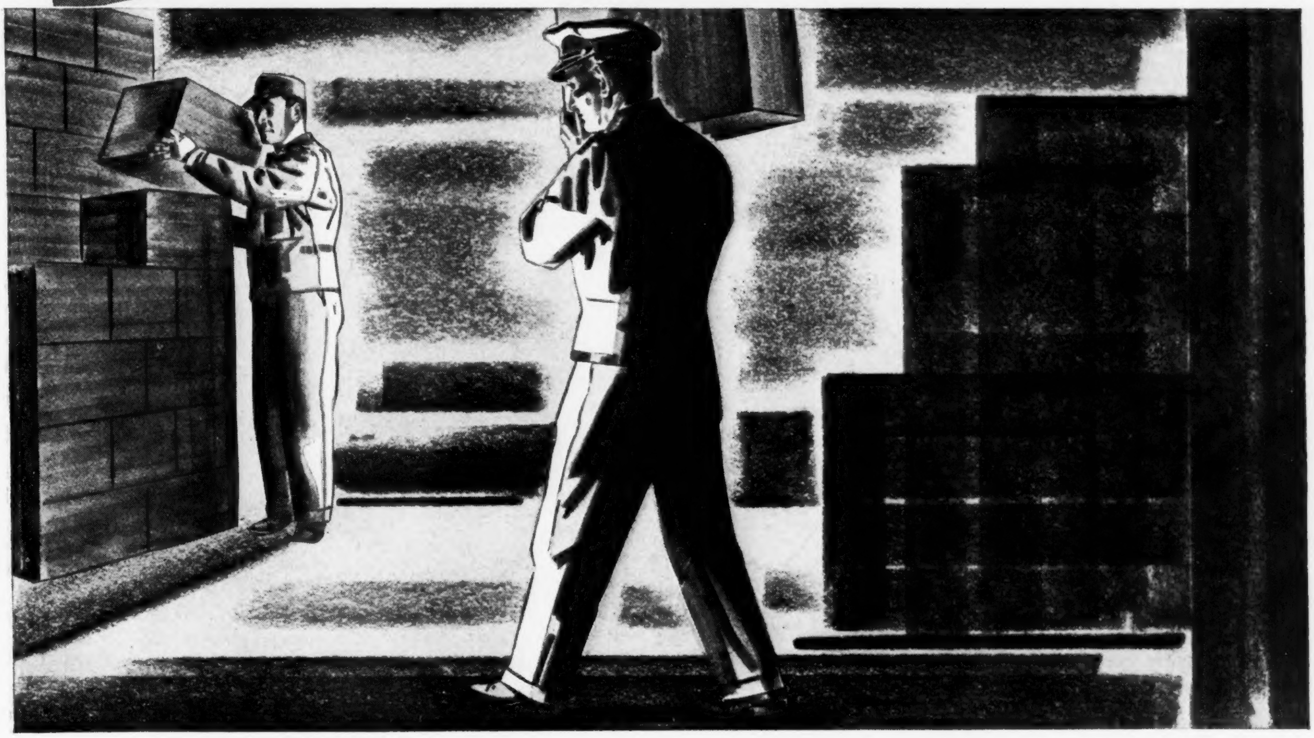
Darpro Chemical Corporation, Newark, N. J., moved recently to larger headquarters at Main and George streets. Modern equipment to provide for larger production has been installed.

Larvex division of Zonite Products is making an expanded campaign to begin in April to promote sales. Theme of the increased publication advertising, "Moths Will Never Eat This Suit."

New Packages, New Products: ***William H. Rorer, Inc., well-known Philadelphia drug firm, offers new plant nutrient; Lever Brothers introduces a new white, floating soap.***



It Was "Double or Nothing"



YEARS ago, lights burned far into the night at the Package Laboratory of H & D. Old heads counseled, "Better give it up. Pack nearly a hundred pounds of paint in a corrugated box? It can't be done."

" . . . Why, we've tried a dozen structural forms, every conceivable kind of reinforcement."

" . . . Heavy stuff like this paint never will be packed in standard corrugated boxes."

* * * *

"Wait a minute!" cried one inspired voice. "Why not make a *double-wall* box? There's your answer, double-wall."

It was — and is — the answer. This phrase "double-wall" identifies an extra strong corrugated box board made by combining three liners with two corrugated sheets. "Heavy stuff," paint, varnish, motors, textiles, and similar products are now being shipped in double-wall corrugated boxes. Shipped safely. Shipped from here and there to everywhere.

When the chips were down — when it was "double or nothing" — when the Package Laboratory had to solve a tough problem or lose a potentially large market — H & D engineers shipped heavy stuff in double-wall boxes.

Isn't it natural, isn't it logical to think that the organization responsible for this *and many another* pioneer achievement in the world of packaging . . . has the ability, the experience and the facilities to solve *your* packaging problem?

HINDE & DAUCH

Executive Offices: Sandusky, Ohio

Better See H&D Authority on Packaging

FACTORIES: BALTIMORE • BOSTON • BUFFALO • CHICAGO • CLEVELAND • DETROIT • GLOUCESTER, N. J. • HOBOKEN, N. J. KANSAS CITY, KANS. • LENOIR, N. C. • MONTREAL • MUNCIE, IND. • RICHMOND, VA. • ST. LOUIS • SANDUSKY, OHIO • TORONTO

Booklets & Catalogs

Foreign Literature DIGEST

By

T. E. R. Singer

ZHURNAL PRIKLADNOI KHIMII, XIII, No. 6, p. 797-821 (1940).

Soviet Research men have been working on the application of *Magnesium Silicates* as fireproof materials, since magnesite brick, the only fireproof material produced in considerable quantities in the USSR, can no longer fully satisfy the requirements of industry. Experimental results have shown the magnesium silicates to have excellent possibilities, but almost no study has been made as yet on the chemical composition of raw material serpentinites of various conveniently located regions in southern Russia. The exact composition is given for a typical fire brick made of the materials under discussion and used in a furnace in the cement industry. The method of preparation and the characteristics of the finished brick are also given. The durability of such bricks has not yet been determined.

The Russians have also developed a method for the production of fireproof material from dolomite. The dolomite is calcined at 1200°, and the resulting material treated with an ammonium chloride solution, which eliminates the calcium oxide present, in the form of the chloride. This method can be worked in conveniently in the production of soda by the ammonia method. There are very large dolomite deposits in the south of Russia.

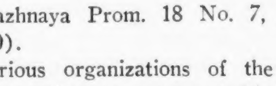
Measures should be taken, according to the author, to interest the institutes of the Academy of Sciences of the USSR, as well as other institutes and economic organizations in the study of the southern sources of magnesium silicates.

Although magnesium silicates have been used as fireproof materials for centuries, a number of sources (ores) have been completely neglected until recently. The Russian investigators have experimented on olivinite, dunite, peridotite, serpentinite, bronzite, talc and synthetic forsterite, and have shown that the finished product is not seriously affected by the type of raw material used. Reactions, etc. occurring in the conversion of the raw materials to fireproof material are given in detail. Tables give the chemical composition of numerous raw materials and extensive numerical data on the production and properties of such fireproof materials. Seven diagrammatic outlines for the production of fireproof materials from each of the raw materials are also given. The Norkomat of Ferrous Metallurgy is expecting to build a plant for the manufacture of approximately 25,000 tons per year of uncalcined forsterite fireproof ware.

Magnesium silicate products can also be used in admixture with other types of fireproof materials. The results of these experiments are already being used by the industry. Magnesium silicates to be used as raw materials in the production of fireproof ware should preferably have the following properties: Chemical composition—not more than 2% Al_2O_3 (3% in a few cases); not more than 6% Fe_2O_3 for high grade products and not more than 12-15% for low grade products (except in olivinites); not more than 1.5-2% CaO; not less than 37% MgO for serpentinites and 25% for talcs. The presence of calcium carbonate is very undesirable. The mineral should preferably be dense and homogeneous.

Bumazhnaya Prom. 18 No. 7, p. 4-11 (1940).

Various organizations of the USSR have recently become interested in the possible utilization of *CYMOL*, a by-product from the manufacture of sulfite cellulose. Kaminski and Khodakov discuss the properties of p-cymol,



In 1914-18 it was used for the production of toluol and cumol by reaction with benzene in the presence of aluminum chloride. The yield of toluol was 80% of the theoretical. Direct oxidation of the cumol yields benzoic acid which is made industrially only from toluol. A brief review follows giving the changes in toluol manufacture after the war. p-Cymol is as valuable as isopropyl benzene as an admixture to high octane aviation fuels, having an octane number of 128. Aminocymol is reported to be even more effective for the

(Continued on page 354)

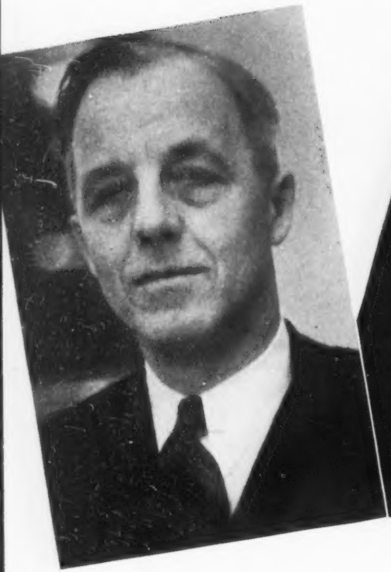
American Institute of Mining and Metallurgical Engineers

AIME's 154th meeting in New York, Feb. 17-20, brought out one of largest gatherings in Institute's history. Right, George C. Bateman, president of the Canadian Institute of Mining and Metallurgy, speaking at annual banquet; Herbert G. Moulton, retiring president of AIME; John R. Suman, president-elect, and C. Will Wright of Bureau of Mines and well-known authority on world mineral distribution. Below, left to right, Herman C. Bellinger, who received William Lawrence Saunders Medal, Mrs. Henry G. Doll, receiving Anthony F. Lucas Medal for her father Conrad Schlumberger, deceased, and her uncle, Marcel Schlumberger, who is in France, H. G. Moulton presenting medal, and Robert C. Stanley, who received Charles F. Rand Medal.

Above, left, J. S. "Doc" Unger, Class of 1941 Legion of Honor (fifty years a member); right C. L. Wyman, Butler Bro., Cleveland, O.; below, left, John Chipman, Professor of Metallurgy, Massachusetts Institute of Technology; below, right, John M. Boutwell, member Board of Directors of AIME and retiring chairman of Mining Geology Committee.

Upper left, Clyde Williams, Director, Battelle Memorial Institute; upper right, A. C. Richardson, Battelle Memorial Institute. Immediately above, left, Dr. E. S. Moore, University of Toronto; right, Dr. D. H. McLaughlin, Harvard University and new chairman Mining Geology Committee. Below, left to right, Albert I. Blank and Oliver B. Atkin of Chase Brass and Copper Co.

N. Y. Section, A. I. Ch.E.: Below left, Dr. Chester L. Knowles, Chemical Sales Director of the Dorr Company, who retired as Chairman of the New York Section at the February 18th Meeting held at the Chemist's Club. Below, right, Edward L. Bernays, well-known Public Relations Counsel, in his after dinner talk on "Propaganda for Democracy" gave his listeners something to think about.

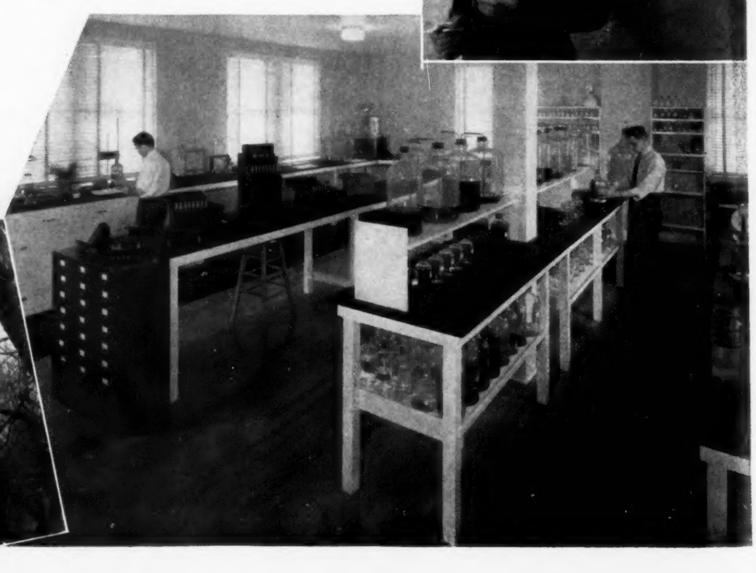


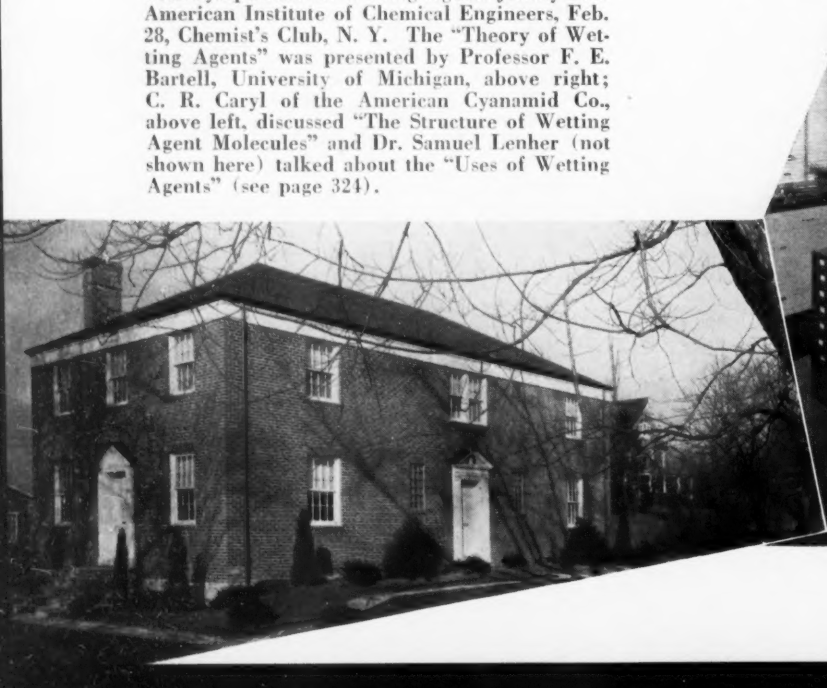
Chemist's Club Symposiarchs: Second in the series of meetings featured "If We Go to War." At the top, left, Bernard Capehart, noted aeronautical authority, and at his right, Christopher T. Emmet, chairman, N. Y. Committee to Aid Britain by Reciprocal Trade. Directly above, Fletcher Pratt, naval and military expert, N. Y. Evening Post, and Commander G. Kephart, U. S. Navy.

N. Y. Section, A. I. C.: Right, Richard S. Morse, President, National Research Corp., who spoke on "Vacuum Technology Opens New Fields for Chemists" at the February meeting.

Taylor's New Laboratory: Below, W. A. Taylor & Co., Inc. (specialists in pH and other control equipment), has recently moved into modern new quarters in Baltimore. Views here show general laboratory with landscaped grounds and up to date interior arrangement.

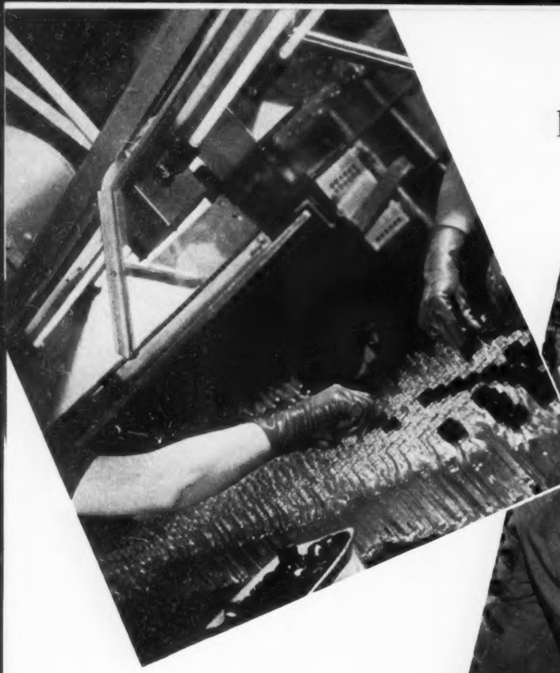
S. C. I. Discusses Wetting Agents: Society of Chemical Industry [American section] held Symposium on Wetting Agents jointly with American Institute of Chemical Engineers, Feb. 28, Chemist's Club, N. Y. The "Theory of Wetting Agents" was presented by Professor F. E. Bartell, University of Michigan, above right; C. R. Caryl of the American Cyanamid Co., above left, discussed "The Structure of Wetting Agent Molecules" and Dr. Samuel Lenher (not shown here) talked about the "Uses of Wetting Agents" (see page 324).





Irradiated Prescription Bottles

Latest News In Packaging



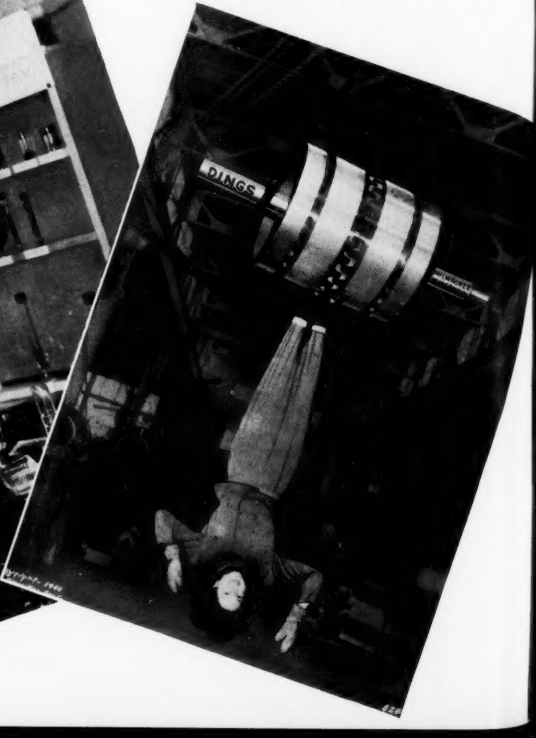
Sequence above shows the steps in the Westinghouse process used by the Brockway Glass Co., Brockway, Pa., providing ultraviolet radiation to sanitize druggists prescription bottles during manufacture. Marketed as "Sani-Glass," the bottles are offered to pharmacists with a plan which enables them to secure similar lamps for irradiating compounding areas on prescription desks. Top left photo shows bottles being irradiated by "Sterilamps." Next, a "Sani-Glass" fixture to irradiate the area in which prescription is compounded. Photo of bottles shows mold growth in bottles irradiated and exposed to air. Photo to the right shows the intake duct with its labyrinth of Sterilamps which figures in the process.

Left, Dr. Tracy C. Jarrett who has been appointed chief metallurgist for Koppers Company, American Hammered Piston Ring Division, Baltimore.

Below, Alice Weltman, Bronx, N. Y., and Elcie C. Stahl, Brooklyn, the only two feminine members among 600 men in the graduate school, Brooklyn Polytech. Both are recent graduates of Hunter College.

Below, a high school student making a transparent specimen of a small vertebrate in the laboratory of the American Institute Science and Engineering Clubs' new home at 310 Fifth Ave., N. Y. City.

Below, the picture's not upside down, it's the girl. It's all done with high intensity equipment, a magnetic pulley used in the factory of Dings Magnetic Separator Co., Milwaukee, Wis.



NEWS OF THE MONTH

GOVERNMENT

Extend Export Control

PASSING one of its busiest periods as far as export control is concerned, the government in the last month (1) tightened control over shipments of goods from this country by requiring more detailed information than ever in applications for export licenses, (2) cut red tape in order to speed shipment of goods to Britain and (3) placed additional articles and materials under the export licensing system including a number of animal and vegetable fats and oils.

In a proclamation accompanied by executive order, effective March 10, the government placed under control cadmium, carbon black, coconut oil, copra, cresylic acid and cresols, fatty acids produced from vegetable oils under export control, glycerine, palm kernel oil and palm kernels, pine oil, petroleum coke, shellac, titanium.

A second proclamation effective March 24 covers jute, lead, borax and phosphates. Third proclamation, effective April 15, includes plans, specifications or technical information used in connection with the production or processing of any of the items under control.

This order, it was revealed, is regarded as essentially designed to conserve the supply of glycerine and the most important raw materials from which glycerine is obtained.

Late in February the government's tightening control over exports was indicated by a list of about 40 items divided into two categories. On the first, exporters must give much more detailed information in order to get their licenses and on the second they must get "general country" affidavits requiring records of exports from 1935 to 1940. This, it was said, is designed to keep shipments to any one country within the limits of that country's normal purchase from the U. S.

Products in the first category, requiring single affidavits, are abrasives and abrasive products, aluminum, ammonium compounds (including sulfate, urea and uramon, ammo-phos and ammonium phosphate), antimony, asbestos, balancing machines, bromine, chromium, cobalt, cotton linters, dimethylaniline, ethylene, ethylene dibromide, gauges, horse and cattle hides, hydraulic pumps, industrial diamonds, magnesium, manganese, manila fiber, measuring machines, mercury, methylamine, nitrates, plastic molding machines and presses, platinum, potash, quinine, rubber, silk, strontium, testing machines, tin, toluol, tools incorporating industrial diamonds, and tungsten.

In the second category are: brass, bronze, copper, iron and steel, nickel and zinc.

On March 3, pending enactment of the lease-lend bill, the Export Control Administration cut through red tape to speed up shipments of goods to Britain. Blanket license was issued for the export of 130-odd war items to Great Britain and Northern Ireland.

Among supplies affected were machine tools, aluminum, gasoline, oil, aircraft parts, armor plate, shatter-proof glass, structural shapes, steel piling, antimony, asbestos, chromium, flax, hides, manganese, optical glass, quartz, crystal, sil, wool, ammonia, chlorine and many other metals, chemicals and minerals.

The order left intact restrictions on shipments to Russia, Japan and other countries.

The Merchants Association sent a representative to Washington last month to straighten out a problem in shipping. Export licenses, it seems, specifically exempted goods in transit from one foreign country to another but customs officials recently ruled that to be exempt from licensing, shipment must be made on a through bill of lading. The association says that through bills of lading have not been issued for some time because of the disruption of foreign commerce.

OPM On Priorities

First call on vital materials for defense industries was given assurance last month and this month with the imposition of formal industry-wide priorities by OPM on aluminum, machine tools, magnesium, nickel and neoprene (Du Pont's synthetic rubber).

OPM's action on nickel came a few hours after President Roosevelt had announced that there was not enough nickel in the country to supply defense and civilian needs. Establishment of the priorities on nickel and neoprene was comparatively simple as most of the nickel produced in this country is produced by International Nickel and Brandeis-Goldschmidt and Du Pont is the only producer of neoprene. The actions will make it possible for nickel to flow into factories which are working on both British and American orders.

Shortage of nickel and the desire of OPM to conserve tungsten brought out an interesting highlight this month. Molybdenum metallurgists are now getting a chance to show what they can do about producing alternative alloy steels. A complete discussion of this problem will be featured in an early issue of CHEMICAL INDUSTRIES in an article by Arthur Linz, chemical engineer, Climax Molybdenum.

Fertilizer Indictments

Following a grand jury investigation lasting one year less three days, two trade associations in the fertilizer industry, 64 corporations engaged in the production and distribution of mixed fertilizers and 36 officials of those associations and corporations were named as defendants in an indictment returned Feb. 10 at Winston-Salem, N. C., charging violations of Federal anti-trust laws. Thurman Arnold, assistant attor-

Sales force of J. T. Baker gathered at Phillipsburg, N. J., early this month for the annual sales convention. Ralph Clark, general sales manager, was in charge of the event. Division sales managers, G. B. Hafer, Charles H. Slater and John McAbee conducted the business sessions of the sales clinic.

Dr. Linus Pauling (right), California Institute of Technology, receiving from Professor Arthur W. Hixson, Columbia University, the 1941 William H. Nichols gold medal at the Hotel Pennsylvania, March 7. Prof. Hixson cited the Medallist, who is 40 years old, and one of the youngest to receive the honor, for his "fundamental inquiry into the chemical bond."

ney general in charge of the department of justice, anti-trust division, made the announcement of the indictment.

Defendants, according to the indictment, are charged with conspiring (1) to fix uniform prices of mixed fertilizers and (2) to suppress competition in these products for a period of more than 10 years. Set out in detail in the indictment are many restrictive measures said to have been used by the defendants in making effective the alleged conspiracies.

Brand Issues Statement

Charles J. Brand, executive secretary and treasurer of the National Fertilizer Association which is accused of being the instrumentality for many details of the alleged conspiracies, sounded the industry's attitude toward the indictment when he said "the association is willing to be judged by its record." Other association involved is the Superphosphate Association, Inc., Charleston, S. C.

"An indictment or true bill," Mr. Brand reminded, "is not a verdict of guilty as so many people seem to think—it is in fact not even an indication of guilt. It is only a formal accusation made by at least 12 out of 23 grand jurors after an investigation at hearings where for the most part only the government's side is heard.*

Anti-Trust Nitrogen Suit

Defendants in Government's anti-trust action against nitrogen products manufacturers entered pleas of not guilty recently in the United States District Court to a series of 5 indictments which alleged violations of the Federal anti-trust laws.

Judge Alfred C. Coxe gave all defendants 30 days in which to file motions with respect to the indictments, and set the trial for April 14.

*Chemical Industries has covered the fertilizer industry case since its inception Feb. 10, 1940. For a more complete basis of what has happened refer to the following: Pp. 346, March, 1940; 177, August, 1940; 297, September, 1940.

Plead Not Guilty

Seven men prominent in the metals industries of the country, led by Arthur V. Davis, chairman of the board of directors of the Aluminum Company of America, pleaded not guilty last month to charges of violating the anti-trust laws before Federal Judge Alfred C. Coxe who released all the defendants in bail of $1,000 each.

At the same time, 5 American concerns accused with others of illegally controlling and restricting the magnesium industry in this country also entered pleas of not guilty. Indictment had been made Jan. 30 alleging that the five corporations had conspired with I. G. Farben Industrie, Germany, and its officials.

Government attorneys are looking into the assets of the German organization for seizure in case a fine should be levied.

Individuals and companies denying the charges were: Roy A. Hunt and the Aluminum Company of which he is president; Irving W. Wilson, and American Magnesium of which he is president; Willard D. Keith, Karl Hochswender and the Magnesium Development Corporation of which they are director and president respectively; Dow Chemical, Willard H. Dow, president, and Earl Bennet, vice-president; and the General Aniline and Film Corp.

GENERAL

Chemurgists to Chicago

Chemurgy's role in national defense will be the basis of discussions at the Annual Chemurgic Council of Agriculture, Science and Industry to be held in Chicago, March 26, 27 and 28.

Some of the speakers scheduled for the council include Dr. P. D. Peterson, Freeport Sulphur; G. M. Tisdale, U. S. Rubber; and Howard R. Huston, American Cyanamid. W. J. Cameron, Ford executive, will address the banquet Thursday evening, March 27.

Chicago Exposition Dates

Dates for the Second National Chemical Exposition at the Stevens Hotel, Chicago, have been set ahead to Oct. 27-Nov. 1, 1942, according to Dr. W. F. Henderson, chairman of the Chicago Section, American Chemical Society, in an effort to increase out-of-town attendance with what is hoped will be more favorable weather.

Chairman of the exposition committee is Victor Conquest, director of research for Armour & Co., Dr. Henderson has announced. This committee is in charge of all activities connected with the exposition.

Marcus W. Hinson is again exposition manager.

Early indications are that space requirements for '42 will be more than doubled. There will be a much larger plastics exhibit as well as a large increase in the number of chemical exhibitors.

Heads Advisory Council

Dean William T. Read, School of Chemistry, Rutgers U., was recently re-elected president, Chemist Advisory Council, N. Y. City. Other officers re-elected were: Dr. Gustavus J. Esselen, vice-president; R. Bhagwat, secretary and Robert T. Baldwin, treasurer.

Council is launching a nation-wide drive for funds to carry on its work for the current year, requesting every chemist and chemical engineer earning $35 a week to contribute a "Professional" dollar. Checks, money-orders or cash may be sent to the Council's headquarters, 60 E. 42 st., N. Y. City.

Over 60 local committees have been formed throughout the country to inform chemists and chemical engineers about the work of the Council and to assist in collecting funds. The American Institute of Chemists has donated $400 this year to the Chemist Advisory Council and other groups, such as the North Jersey Section of the A. C. S. and the Western Connecticut Section, have contributed liberally. The Council is seeking $6,000 for its 1941-42 fiscal year.

Plastics to Replace Metals

Monsanto plastics research engineers and chemists were placed at the disposal of executives of metal-consuming industries last month to assist in breaking the bottlenecks caused by shortages of various essential defense metals such as aluminum, magnesium and zinc, Edgar M. Queeny, president, announced.

Decision On "Cellophane"

Right to exclusive use of the word "cellophane" has been denied Du Pont in a decision of Federal Judge Robert N. Pollard, at Richmond, Va. Du Pont had sought to enjoin Sylvania Industrial from use of the term for a cellulose material which it manufactures at Fredericksburg.

Judge Pollard held in effect that "cellophane" was a generic term and that no other word or combination of words could adequately describe the product.

Alleges Conspiracy

An indictment alleging conspiracy to restrain production and importation and to control the pricing of magnesite bricks and dead-burned magnesite brought pleas of not guilty from 5 corporations and 7 individuals in Federal Court, N. Y. City, last month. Trial date has been set by Judge Coxe for March 18. Three Austrian companies named in the indictment did not enter pleas.

ASSOCIATIONS

Electrochemists at Cleveland

Seventy-ninth general meeting of the Electrochemical Society will be held at the Cleveland Hotel, Cleveland, April 16-19. Although final program of papers is not complete, it is understood, 17 papers already accepted indicate a wide range of interesting subjects to electrothermic and electrolytic industries.

Call Meeting Off

Because of growing demands upon its engineering personnel, the International Acetylene Association has called off its 41st annual convention scheduled for Cincinnati, April 2, 3, 4, it has been announced.

N. Y. Chapter, A. I. C.

Dr. A. W. Ralston, author of numerous patents and articles pertaining to the synthesis of chemicals from fatty acids, will address the N. Y. Chapter of American Institute of Chemists, at the Chemists' Club, N. Y. City, April 4, at 8 o'clock. Dr. Ralston, associated with Armour & Company, will speak on "Chemicals From Fats."

Landis Nominated

At the next annual meeting of the Chemists Club, N. Y. City, officers for the coming term will be elected. Following are the selections of the nominating committee: President, Walter S. Landis; resident vice-president, Ralph E. Dorland; non-resident vice-president, Robert L. Murray; suburban vice-president, Per K. Frolich; secretary, Robert T. Baldwin; treasurer, Ira Vandewater; and trustees, 1941-44, Charles R. Downs and Albert B. Newman.

A. I. C. Picks Capital

Annual meeting of the American Institute of Chemists will be held May 17 at the Wardman Park Hotel, Washington, D. C. The Washington Chapter of the Institute who will act as host for the meeting is busy with plans for the event at which a record crowd is expected to attend. Many of the members of the Institute will be accompanied by their wives. A special program for the ladies is being planned.

In connection with the formulation of plans Dr. Harry L. Fisher, president of the Institute and Dr. Robert L. Moore, former president, attended a special meeting of the Washington Chapter on March 4.

A. I. C. Medallist for '41 is Dr. Henry Granger Knight, well-known government chemist and the directing force in back of the new government regional laboratories.

Dr. Fisher, president of the Institute, will speak before the Niagara Chapter on March 28 at a dinner meeting. A joint meeting of the Washington Chapter of the A. I. C. and the Washington Section of the A. C. S. will be held April 11.

Canada's War Efforts

Floyd S. Chalmers, internationally known editor of the *Financial Post*, Toronto, will address the N. Y. Section of the American Institute of Chemical Engineers, Wednesday, March 26 at 8:00 P. M. at the Chemist's Club, 52 E. 42 St., on the subject "Canada's Industrial Front."

FLOYD S. CHALMERS

In his address, Mr. Chalmers will analyze Canada's industrial contribution in the war, review the changes in Canada's business and economic life since the war's start and discuss the manner in which war contracts have been allocated in Canada. Regular meeting of the N. Y. Section will be preceded by a dinner at 6:30 P. M., it has been announced. The general public is welcome to attend both the dinner and the meeting. Dinner reservations should be made with the Chemists' Club manager, LExington 2-7649.

Newly-elected officers of the N. Y. Section, A. I. Ch. E., are: Walter J. Murphy, editor, CHEMICAL INDUSTRIES, chairman; Harry E. Outcault, in charge of technical sales service, St. Joseph Lead Company, vice-chairman; Ray J. F. Kunz, Cooper Union, secretary and treasurer.

WASHINGTON

(Continued from page 304)

Loan Administrator Jesse Jones has adopted a cautious attitude toward loans for synthetic rubber plants. "The government isn't going to rush into this thing," he commented at a press conference. The rubber stockpile now contains a 2½ year supply if our foreign sources are cut off, he said, and the International Rubber Control Committee is continuing production at 100 per cent. to meet further U. S. orders.

"Tight situations" in aluminum, zinc, nickel, tungsten and other metals have led OPM to begin a drive to encourage substitutes, largely plastics and glass. The Bureau of Standards has expanded its advisory service for manufacturers of civilian goods who wish to replace unobtainable metals with plastics. Housewives are being urged through the National Defense Commission's consumer section to buy heatproof glass kitchenware instead of aluminum. Synthetic fibres, clad metals and resins are believed by OPM to be sufficient to replace many of the items needed for defense.

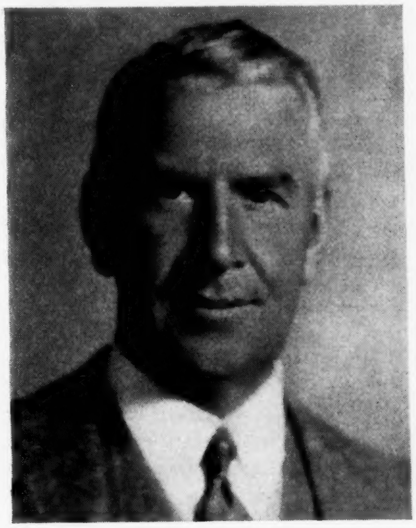
The Childersburg, Ala., bag-loading plant will be managed and operated by the Brecon Loading Co., wholly-owned subsidiary of the Coca-Cola Co., under a $14,394,001 cost-plus contract. Of this total $1,091,000 represents the cost of equipment. Du Pont has been awarded a cost-plus contract for $47,997,000 to construct, equip, and prepare for operation the smokeless powder plant to be operated in conjunction with the loading facility. According to the War Department, the Du Pont Charlestown ordnance works will be completed June 1 and the Hercules powder plant at Radford, Va., will be built by July 1.

Export control was extended in a presidential proclamation to beryllium, graphite, electrodes, aircraft pilot trainer, belladonna, atropine, sole leather and belting leather.

OBITUARIES

J.-M. Vice-President

J. J. Greene, 63, vice-president, Johns-Manville Sales Corporation, died Feb. 27 at Avon Park, Fla., following a heart attack he suffered earlier in the afternoon while playing golf. Mr. Greene's home was in New Rochelle, N. Y. Widely



known in the electrical and utilities fields, he was a member of the Mohawk Club of Schenectady, the Engineers Club of N. Y. and the Wykagyl Club of New Rochelle. He was also a member of the American Gas Association and the National Electric Manufacturers Association.

Ernest O. Patz

Ernest O. Patz, 69, chemical manufacturer, died March 6 in White Plains Hospital, N. Y. after a brief illness. At the time of his death he was president of Franklin Import & Export, Franklin Aniline & Chemical, Nyanza Color & Chemical and the Chemical Manufacturing Co., Inc., Ashland, Mass.

Other Deaths of the Month

Ralph L. Nottebaum, 69, founder and chairman of the board of Noxon, Inc., household chemical specialty manufacturers, died at his home in Short Hills, N. J., after a short illness, Feb. 26. Mr. Nottebaum founded Noxon in 1912 for the manufacture of cleaners, insecticides, waxes and plant sprays. He leaves a widow and two sons.

Frederic Thomas Manley, 60, retired vice-president of the Texas Company died Feb. 25 at Miami leaving his widow, Mrs. Ann Manley and a brother. He was widely known as co-developer of the Holmes-Manley process for extracting gasoline from crude oil. His home was at Bolivar.

Benjamin H. Brewster Jr., 69, president of Baugh Sons & Company, Baltimore, died Jan. 28 at Boca Grande, Fla., after a short illness.

Hugh W. Pearson, 63, organizer and president, U. S. Kalsomine Co., N. Y. City, died Feb. 25 at his home in New Brighton, S. I. He had retired from business Feb. 1 after serving as president for 20 years. Surviving are his wife, 2 daughters and 4 sons.

PERSONNEL

Hooker Elect Officers

H. M. Hooker was re-elected president of Hooker Electrochemical Company, Niagara Falls, at a regular meeting of the board of directors in late January. Other officers re-elected were; E. R. Bartlett, executive vice-president; R. L. Murray, vice-president in charge of development; R. W. Hooker, vice-president and sales manager; L. A. Ward, secretary and assistant treasurer; J. F. Bartlett, treasurer and assistant secretary; W. A. Perrin, assistant treasurer; D. A. Riordan, assistant treasurer.

Following appointments were made by the company: B. Klaussen, works manager, Niagara Plant; A. H. Hooker Jr., Western sales manager, Tacoma Plant; J. A. Flynn, works manager, Tacoma Plant; Dunbar Meek, purchasing agent, H. W. Hooker Jr., assistant purchasing agent; G. F. Rugar, in charge of sales promotion; T. L. B. Lyster, chief engineer.

Beer Retires

Frederick A. Beer, president, Western Dry Color, Chicago, has retired from active duties and has been elected chairman of the board. Lawrence Reed, son of the late R. M. Reed, founder of the company, succeeds him. Rufus M. Reed Jr. in charge of the technical department was elected vice-president and secretary and P. M. Rauen, treasurer.

Rutland in New Position

J. W. Rutland is now Southern sales representative for Union Potash and Chemical with offices at 494 Spring st. N. W., Atlanta. Mr. Rutland was head of the Materials Department of I. A. C. for many years.

Hoffman Promoted

Arthur H. Hoffman was elected president and treasurer of Strohmeyer & Arpe Company, N. Y. City, at the annual meeting last month. Other officers are: Walter A. Benz, vice-president and secretary; Alfred F. Drucklieb, assistant secretary. Company is one of the oldest N. Y. City importers of olive oil, food products and commercial waxes.

Merwin Now President

J. C. Merwin vice-president and treasurer Chain Belt Co., was elected president at the annual meeting of the board of directors to succeed C. R. Messinger who died Feb. 4. G. M. Dyke assistant treasurer was elected treasurer; A. F. Kessler is the new Comptroller. Walter Kasten, president, First Wisconsin National Bank of Milwaukee, was made a director at the stockholders meeting.

Joins California Chemical

L. M. Aycock, formerly with F. W. Berk & Company, has been appointed to the sales department of California Chemical Company. He will concentrate on sales of magnesium oxide to the fertilizer industry.

Others In New Positions

J. Arthur Singmaster, president of Singmaster & Breyer, consulting chemists and metallurgists, N. Y. City, has been elected a director of the Dictaphone Corporation . . . **H. C. Meyer Jr.,** graduate of U. of P. now is associated with Foote Mineral as a junior analyst . . . **Daniel B. Curll Jr.,** research director, Rumford Chemical, was elected a director of the company. . . . **Elmer C. Lusk,** formerly associated with Jeffrey Manufacturing Co., St. Louis, has joined the technical staff of Battelle Memorial Institute, Columbus. He is assisting with various ore dressing and coal preparation investigations in progress there.

Ashland Henderson, formerly metallurgist with Frigidaire has been named to the technical staff of Battelle Memorial Institute, Columbus, Ohio, assigned to a research investigation aimed at the development of metal surfaces resistant to wear, corrosion and chemical attack for specialized industrial uses . . . **J. J. Wisler,** associated for the past 17 years with Samuel D. Keim, Philadelphia, fertilizer materials broker, is now connected with Sea Board Supply Company where he will center his efforts on feed concentrates. . . . **H. W. North,** inventor and designer of mixing and processing machines and an engineering expert on the manufacture, use and application of such equipment, has resigned his position as consultant with Patterson Foundry and Machine. . . . **Theodore Cohn** has resigned as refinery superintendent with Kern Trinidad Oilfields, Ltd., to join the staff of Welland Chemical Works, Ltd., Niagara Falls, Ont., as chemical engineer. . . . **Frank L. Herle** and **Joel H. Hirsch,** formerly with DeFlorez Engineering Company have opened a consulting engineering partnership with offices in the Wheeler Kelly Hagny Building, Wichita, Kans.

Solvents Granting Licenses

Licenses for application of lacquers at elevated temperatures containing a much larger proportion of solids than has heretofore been possible now are being granted by Commercial Solvents, N. Y. City.

Issued under U. S. Patent No. 2,150,096, licenses are for a new technique for applying lacquers at higher temperatures, 150°F. to 160°F., for example. Convenience and marked saving in cost have attracted widespread interest in this "hot" lacquer process.

COMPANIES

S. & W. Appoints Miller

Stroock & Wittenberg Corporation has appointed Carl F. Miller & Company its sales representative in the Northwest Territory and its affiliate, Miller & Zehrung Chemical Co. to cover Portland, Oregon.

Henry M. Lindau, member of the technical sales staff of Stroock & Wittenberg, will supplement Miller's efforts in connection with the company's synthetic and natural resins in the California and Northwest territory.

Falk Has New Line

Announcing substantial improvements in its dehydrated castor oils marketed under the trade name "Castung," Baker Castor Oil, N. Y. City, has also announced appointment of Falk & Company, Pittsburgh and Chicago, as special representative.

Appointment, it was said, is made so that Falk laboratory facilities may be available to give technical service on the proper uses of these oils.

D. H. Litter Company's New York laboratories are servicing these materials for the Eastern territory.

Columbia's New Sales Office

Columbia Chemical Division, Pittsburgh Plate Glass, opened a chemical sales office at 615 Johnston Bldg., Charlotte, N. C., it was announced last month by W. I. Galliher, director of sales. James R. Simpson, former director of Duke University's appointments office has been named district sales manager in charge of the office.

Company News Briefs

Borden & Remington, Fall River, Mass., has been awarded a plaque by Philadelphia Quartz commemorating 30 years' association during which the company has been distributor and agent for its products in lower New England.

Greatly expanded research activities at Mellon and at the Koppers' laboratories have been inaugurated in an attempt to create new and improved chemicals from coal. Research staff has been increased to 67 during the past year, according to the company, and will be enlarged to about 100 during the coming year.

Expecting production of sodium chlorate from its new plant in Portland, Oregon, this summer, Pennsylvania Salt Manufacturing Company has named Chipman Chemical Company, Bound Brook, N. J., selling agent.

R. W. Greeff & Company, Inc., 10 Rockefeller Plaza, N. Y. City, has announced the opening of new offices at 1905 Tribune Tower, Chicago. J. E. Henely is in charge. Telephone is Whitehall 6960-61.

In New Addresses

The Tar & Chemical Division, Wood Preserving Division, Gas & Coke Division of Koppers and the Koppers Coal Co., an affiliate, have consolidated headquarters at 60 E. 42d st., N. Y. City. New telephone number is Murray Hill 2-8040.

Stimulated demand for its heavy, fine and rare chemicals has made it necessary for Worcester Chemical Distributors Corp. to move to enlarged headquarters at 100 Webster st., Worcester, Mass., according to Harry G. Christensen, vice-president.

Clark Chemical, Indianapolis, has removed offices to its new warehouse at 901 High st.

PERSONALS

Stanley Honored

Dr. Wendell M. Stanley of the Rockefeller Institute of Medical Research, Princeton, N. J., was awarded the 1941 Gold Medal of the American Institute of the City of New York last month at the Hotel Pierre for his work in crystallizing the virus of tobacco mosaic. According to the citation it was "a feat which has opened up new fields of research, given birth to new ideas about the nature of important disease-producing agents, and enlarged the human understanding of life."

On Trustee Advisory Group

Charles P. Gulick, president and chairman of the board of National Oil Products, has been appointed to the Trustee-Advisory Committee of the College of Pharmacy, Rutgers it was announced last month by Robert C. Clothier, president of the University.

Ruddock Lectures

Amos Ruddock, market development specialist for the Special Products Division of Dow, was guest speaker at a February luncheon of the Detroit Adcraft Club. His subject was "Midland Magic."

CONSTRUCTION

Increases Reynolds Loan

The $15,800,000 loan made recently to Reynolds Metal for the production of pig aluminum and fabricated aluminum products has been increased to $20,000,000, according to Jesse Jones, Federal Loan Administrator. Company is building two additional units at Sheffield, Ala. and a third will soon go up at Bonneville Dam, Ore.

Sheffield plants are expected to produce 40,000,000 lbs. of pig aluminum annually, Bonneville, 60,000,000.

Mr. Jones also revealed that about $10,000,000 is being furnished by the Defense Plant Corporation, RFC subsidiary, for a sheet metal plant at Sheffield and about $3,000,000 for an extrusion plant at Louisville, Kentucky. Both plants will be leased to Reynolds.

Construction Digest

Aluminum Company of America last month bought the half interest in American Magnesium Corporation formerly owned by General Aniline and Film Corp. making American Magnesium a wholly-owned subsidiary of ALCOA. Transaction, together with contemplated construction of new plant facilities will cost several million dollars it was said.

ALCOA, it was announced, will start immediately on the further expansion of operations of the new acquisition so that the manufacture of magnesium products will be greatly increased. New plant facilities are to be established at Buffalo and existing ones are to be augmented at Cleveland, Los Angeles and New Kensington, Pa.

A contract has been signed between Solvay Process, Hopewell, Va., and the War Department for the construction of an $11,000,000 anhydrous ammonia plant at Henderson, Ky., it was announced last month. It is understood that arrangements have been made with T. V. A. for electric power. Final plans for construction and operation of the plant have not as yet been worked out.

Completion of plans for construction of a Houdry catalytic cracking and reforming plant at its El Segundo refinery in Southern California is announced by Standard Oil of California. To cost $4,-500,000, new plant will provide high octane gasoline.

Merck & Co. will erect a plant for chemical and drug manufacture three miles south of Elkton, Va., on the Shenandoah River. Tentative estimates place the cost of the new plant at more than $500,000.

Directory of Consultants

Sixth edition of its directory of association members was released recently by the Association of Consulting Chemists and Chemical Engineers, Inc., 50 East 41st st., N. Y. City. Divided into three parts, (1) a directory of members, (2) one-page descriptions of member organizations and (3) a "key-sheet" of various types of work and service handled by members, the directory may be obtained free upon application.

MARKETS IN REVIEW

Heavy Chemicals • Fine Chemicals • Coal Tar Chemicals • Raw Materials • Agricultural Chemicals • Pigments and Solvents

GENERAL business in February stood at the highest level prevailing for 11 years. Small wonder then that chemical production and shipments reached record new levels last month. The Defense Program swinging into a faster tempo with each week and despite spotty but serious labor troubles in various manufacturing sections is directly and indirectly increasing the chemical sales volume. Tightening of certain materials is leading buyers into attempts to make forward committments in many products. One of the highlights of the month was a decided upswing in prices of commodities originating in the Far East—area of considerable tension. Freight rates to and from the Far East have been adjusted upward and ship bottoms are scarce. War risk insurance rates are now only given 7 days in advance of actual sailing, whereas previously by the payment of a small fee over the then existing premium the rate could be guaranteed for 30 days. The war clouds over the Pacific are casting deep shadows on commerce.

Practically every division of industry is contributing to the heavy chemical consumption rate during the first quarter. Textiles, both cotton and wool, are close to capacity; rayon output continues at a high peak with still further increases in sight later in the spring; paper and leather industries are busy.

Automotive manufacturers are rushing at an unprecedented rate to build up backlogs against the possibility of no new models. Rubber industry, of course, keeps pace with the automobile industry. Steel operations are at capacity levels in most instances. The plastics industry's gains are phenomenal. Sales in the chemical field are running 12%-15% ahead of the like period a year ago with some items recording much greater gains.

Priorities Cause "Jitters"

Placing of priorities on aluminum, magnesium, nickel, etc., has caused some jittery feelings. Buyers are more anxious, sellers are a little more chary of accepting orders. The industry looks for a number of important price changes, but where the lightning will strike it is hard to say. The Government to date has not been an important factor in purchasing of chemicals, but several of the plants now being erected will be coming into operation in about 6 months and when that time comes there may be some shortages that will force the hand of the Chemical Priorities Board. One of the pastimes in the industry is trying to name these products. Leading in the unofficial nominations are sulfuric, nitric, toluol, sodium nitrate, sulfate of ammonia.

Important Price Changes

ADVANCED

	Feb. 28	Jan. 31
Acid capric	$0.12½	$0.12
Acid tartaric	.57½	.51½
Aluminum acetate, powd.	.33	.22
Bone, raw, domestic	32.50	30.00
Bone meal, steamed, dom.	40.00	33.00
Cadmium, metal	.85	.80
Copper acetate	.24	.22
Copra	.02n	.0180
Cream of tartar	.47½	.42½
Crotonaldehyde, cl. drs.	.13	.11
Gambier, common	.07	.06½
Singapore cubes	.09	.08½
Hoofmeal, Chicago	2.75	2.70
Lead, Red, dry 95%	.0815	.08
97%	.0840	.08¼
98%	.0865	.08½
Litharge	.0715	.07
Mercury	174.00	167.00
Menthol, Chinese	3.90	3.75
Methanol, denat. grade	.45	.40
Myrobalans J1	45.00	35.00
J2	36.00	26.00
Nicotine sulfate, drs.	.703	.70
Oil, coconut, crude, tks.	.03½	.03⅜
Castor, dehydrated	.1320	.1310
Chinawood, tks.	.26¾	.26¼
Menhaden, crude, tks.	.37n	.35n
refined, drs.	.0980	.0950
Sardine, crude, tks.	.50n	.43n
Paraffin, crude, white	.0275	.0265
Yellow	.0275	.0260
Rochelle salt, cryst.	.36½	.32½
Powd.	.35½	.31½
Sago flour	.03¾	.03½
Sodium stannate	.33	.32½
Seidlitz mixture	.28½	.25½
Shellac, T N	,.20	.16
Superfine	.21	.16½
Bonedry	.28	.26
Garnet	.21	.20
Sodium phosphate, di, bbls.	2.40	2.30
tri, bbls.	2.55	2.45
Anhyd., di	5.60	5.35
Stannous chloride	.47½	.47
Tartar emetic	.42¾	.39¾
Tin straits	.51¼	.5025
crystals	.38½	.38
tetrachloride	.26	.25½
Turmeric, alleppy	.07¾	.07½
Wattle bark, African	38.50	37.50
ext, solid	.04⅛	.03⅞

DECLINED

	Feb. 28	Jan. 31
Acid nicotinic	$7.15	no price
Annatto seed	.06	.06½
Blood, dried, dom., N. Y.	2.65	2.75
High grade, Chicago	2.75	3.00
Imported	2.50	2.55
Blue alkali toner		
Casein, 20-30 mesh	.11½	.12½
80-100 mesh	.12	.12¾
Imported Argentine	.12	.12½
Cottonseed meal 8%	24.50	28.50
Ethyl cellulose	.45	.47
Linseed meal	23.00	24.50
Mannitol, com.	.35	.38
reagent grade	.85	.90
Oil, linseed, raw, tks.	.0880	.09
Olive, denat.	2.25	2.30
Nutgalls, Alleppo	.27	.28
Stearin, oleo	.06¼	.06⅜
Tankage, feed, bulk	2.35	2.75
fertilizer, Chicago	2.40	2.50
Wax, Carnauba, No. 3 chalky	.55	.58
No. 3 N. C.	.58	.62
refined	.63	.66
No. 1 yellow	.68	.71
No. 2 yellow	.66	.69
Japan	.16½	.18

n—Nominal.

For the next few months it is expected that the Chemical Priorities Board will concern itself not with chemicals as such, but in proving to other Boards the vital necessity of easing up on restrictions on materials needed in fabricating equipment for new chemical plants. A relatively few hundred pounds of certain metals used in making catalysts if tied up by red tape could very easily handicap certain manufacturing operations very seriously.

Speed Up Export Licenses

Exporters report some improvement in the time element in getting export licenses through, providing the materials are going to Canada and Great Britain and, of course, are products not on the greatly expanded list of items that the Government considers essential to defense.

Export Ban on Drums

Chemical manufacturers and exporters were for a time last month in a quandry over the export ban on metal drums. However, the State Department clarified the situation on Feb. 14, with the publication of certain exemptions from the Executive Order issued Feb. 4.

Very definitely the ban has been placed on all metal drums and containers containing or clearly intended to contain petroleum products. Except as to these items, the chemical industry is pretty free to continue as it has in the past. Single trip drums, of course, are not subject to the regulations. In the trade the move was looked upon as a clever way of getting around the direct embargo of petroleum products going to Japan.

Unlimited licenses have been issued to the British Iron & Steel Corp. for the export to the British Empire of the drums and containers and all exportations of those articles to that destination may be made without licenses.

Fear Ship Shortage

Grave concern is felt over Far East shipping. Withdrawal of considerable British shipping, together with the likelihood of a cargo priorities plan to help bring in large quantities of strategic materials, such as tin, antimony, chromite, rubber, etc., already contracted for and, in many instances, paid for, are two immediate causes for boosts of from 10 to 15% by the Pacific Westbound Freight Conference, effective March 1. The Far East Freight Conference, likewise, has raised rates to and from the Orient. Likelihood of Government cargo priorities is said to have brought to a head advances just made in east and west bound freight, the lines feeling that higher rates could be sought easier now.

Of interest to producers and buyers is the news that a general upward revision of shipping rates, both all-water and rail-water, between north Atlantic and Gulf ports and between points on the Atlantic seaboard is under consideration. The I. C. C. has assumed as of March 1 complete jurisdiction over coastal steamship rates under the Transportation Act of 1940. Special committees of the steamship operators are now considering the rate problem at joint requests of the I. C. C. and the Maritime Commission. Railroads are said to oppose changes. Several ships in the coastal trade have been withdrawn through sale to the Government. Freight rates on north bound freight from east coast South American ports advanced between 20% and 25% on April 1. Southbound rates are expected to remain unchanged through April.

Also of interest was a domestic rate increase effective Feb. 25. Principal freight forwarders and motor carriers raised their rates to approximately the level of straight rail rates between Chicago and many Southwestern and Western points. Rates to other cities in these districts will be raised March 15. Increases are planned to be applied to Eastern territory later. Effect of increase is to place the whole competition between railroads and motor carriers entirely on the basis of service rather than cost on l.c.l. carload traffic.

So widespread were the various freight rate advances announced last month, the Maritime Commission on Feb. 26 acted to prevent what it called "unreasonably high" steamship rates and directed all conference groups to advise it immediately of all agreed increases.

Heavy Chemicals

Chlorine Supplies Limited

Chlorine is a particularly tight item at the moment and the situation will become still more acute when Government purchases begin to result in actual movement of material. This is more than likely despite sizable increased productive capacity just coming into the picture. Chlorine prices may show advances. The strength in chlorine is hardly shared by caustic, more electrolytic now being available.

Concern is felt over copper and a possible shortage is expected in some quarters. How far this will affect quotations on copper salts is hard to say. Salts and oxides of most of the metals will bear constant watching.

Sulfuric in Demand

Sulfuric is moving in record volume and once the munition plants now building come into production the demand will soar much higher. Spent acid promises to be a problem but will, in all probability, be solved partially at least by diverting such acid to fertilizer producers. In many instances there are terrifically long hauls between acid producing points and the locations of many of the new government owned munition-making plants. In addition, tank cars will not be returned empty but will have to carry spent acid to fertilizer factories.

Steel production (large acid consumption) if sustained at January's level will total in '41 approximately 84,000,000 tons, or the full rated capacity of the industry.

Phosphates Quoted Higher

A firmer position in di- and trisodium phosphates was reported. Prices on these items have been quite competitive for a long period. Increases amounted to 10c per 100 lbs. for crystal di and tri, and 25c for dibasic anhydrous. Nickel salts, including oxide, chloride and sulfate, were in heavy demand as a result of the general belief that nickel would shortly be placed under a Priorities order by OPM and those who scrambled for existing stocks saw their judgment vindicated. Tin derivatives were subject to ups and downs in tune with the changes in gravity of the Far East situation, and for the month sizable price gains were reported. Quotations on tin oxide were withdrawn. Potassium chlorate and oxalic acid continue in a tight position. Sodium chlorate was slightly easier. Normal powdered aluminum acetate was advanced 11c to 33c in barrels delivered. Increases were reported in copper acetate and crotonaldehyde.

Mannitol Again Reduced

Price of Atlas mannitol has been reduced for the 5th time in less than 3 years. This is specially interesting in the light of the present world situation. No longer are we in this country dependent upon natural supplies of foreign origin for mannitol. American chemists have found a way to synthetically produce abundant supplies.

Fine Chemicals

Tartaric Acid in Sharp Advance

Rise in tartars featured fine chemicals. Cause, of course, was the stringent situation in raw materials. Tartaric acid gained 6c (at 57½c at the month-end) and corresponding increases were noted in Rochelle salt, cream of tartar, Seidlitz mixture, and tartar emetic. Resale prices were practically what the supplier asked. Most factors agree that the current rise will continue. Tartaric acid has jumped 11¼c since the start of the year.

Mercury jumped to $174-$176 a flask at the close of the month. One contributing factor was said to be continued rains in the mining regions. No change in the mercurials was noted, but prices are being "eyed" by buyers and advances may come quickly.

Sharp decline in the call at the month-end for seasonal items used in cold, grippe and influenza medicinals was reported, indicating that the peak of winter ills was close at hand. Nicotinic acid and alpha tocopherol (vitamin bases) were two items in the rather exclusive group of declines last month. The plating industry's increasing demand for cadmium metal lent further strength to the cadmium salts. Natural menthol closed at $3.90 as against $3.75 at the beginning of the month. Far East developments gave the item additional price strength.

Alcohol demand is reported heavy with prices firm. Blackstrap quotations jumped ¼c and an increase in alcohol prices would not be too surprising. Demand for alcohol in munition production within a few months is expected to create shortages.

Caffeine resale price was $7-$9.50 per lb., but the quantity available was extremely small.

Coal-Tar Chemicals

Toluol Exports Watched Closely

Demand for coal-tar chemicals and solvents held at high levels in the past 30 days with prices firm but unchanged. Certain items were in the "sold-out" class. Export control on toluol and dimethylaniline was tightened. Benzol tone was better with shipments heavier into industrial channels and into the motor benzol market. Coal-tar acids and intermediates were in excellent demand and an improvement in the call for dyestuffs reflected the steady rise in consuming industries, such as textiles, leather, plastics, etc. Last month the Government asked for bids on dinitrotoluol, and within the next few months requests for bids on picric acid, phenol, toluol and other intermediates are expected.

Coke Operations at Record Levels

January byproduct coke operations broke all previous monthly figures for actual production. Still further slight gains probably will take place but the industry is at maximum capacity operation now and until some of the new byproduct ovens recently contracted for come into the picture there can hardly be any sizable increase in the volume of coal-tar crudes available. January output of byproduct coke was up 0.9% over December.

Naphthalene production was also off in January, the drop amounting to 6.6%. The season for refined naphthalene has opened with a rush. Movement of phenol into plastics and synthetic resins is at record levels and is expected to expand

 Prepared Monthly by U. S. Industrial Chemicals, Inc.

U.S.I. CHEMICAL NEWS

March ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1941

Long-Range Policy Aids U.S.I. In Meeting Demand for Solvents

Consistent Program of Development Benefits Solvent Users In Current Era of Increasing Defense and Industrial Needs

The long-range policy of plant and product development which has been consistently followed by U.S.I. for thirty-four years is proving especially valuable at the present time in helping to meet current demands for alcohol and alcohol-derived solvents and chemicals both for defense purposes and for normal industrial needs.

Current conditions have resulted in a sharp increase in the demand for industrial ethyl alcohol. Even in normal times, alcohol is one of the most important and versatile raw materials used by industry, and its importance today is greatly enhanced by its indispensability in scores of products required for national defense. An additional factor that is operating to increase the demand for ethyl alcohol is the shortage of isopropyl alcohol,

These storage tanks at the Baltimore plant hold a total of more than 20,000,000 gallons of molasses for making U.S.I. Alcohol, which is a raw material for many other U.S.I. products.

which among other things, is now being used for the manufacture of synthetic acetone. Isopropyl alcohol has recently been substituted for ethyl alcohol in some applications, but many of the manufacturers who had begun using isopropyl alcohol have found it desirable to revert to ethyl alcohol as a more

(*Continued on next page*)

Photo shows U.S.I. manufacturing facilities in the Baltimore area. Main photo shows the huge alcohol plant; plant shown in inset is devoted to the manufacture of solvents and chemicals. Other U.S.I. plants are located at Newark, N. J., New Orleans, La., and Anaheim, Calif. Plants are conveniently located on seaboard, and serve leading industrial centers.

Claim New Coating Assists Printing On Aluminum Foil

Medium Boiling Solvents Used With Shellac, Phosphoric Acid

FRAMINGHAM, Mass. — How aluminum foil and similar surfaces can be prepared to receive printing ink by means of a coating employing a medium boiling solvent mixture is revealed in a patent granted to two inventors here.

The coating is described as consisting essentially of an etching agent, a resinous material which, on drying, traps the etching agent from both foil and ink, and a solvent which dries in about 2 to 6 seconds. This drying time, the inventors say, allows the etching agent sufficient time to act on the foil before the coating hardens. Shellac is suggested as a typical resinous material and phosphoric acid as the etching agent.

Solvent Mixture Retards Drying

The slow drying rate on which the success of the coating depends can be obtained by replacing part of the alcohol ordinarily used for dissolving the shellac with other solvents

(*Continued on next page*)

Brown Pigment Useful for Non-Grain-Raising Stains

CHICAGO, Ill.—A form of Vandyke brown pigment that is soluble in mixtures of alcohols and coal tar oils is especially suitable for the production of non-grain-raising stains, it was recently reported here. This form of the pigment, it is said, readily dissolves once in organic solvents, but is not easily dissolved the second time. Shellac can therefore be brushed over stains made with the pigment, without causing it to dissolve in the alcohol used as the shellac solvent.

Suggests Acetone Vehicle For Fluorescent Coatings

MONTCLAIR, N. J.—Fluorescent coatings that dry in a few minutes can be prepared with the aid of acetone or other low boiling solvents such as ethyl alcohol, it is claimed in a patent granted to an inventor here.

A typical coating can be prepared, according to the patent, by dispersing 1 part of a suitable inorganic salt, such as monoaluminum phosphate, in 50 parts of acetone, and then adding 10 parts of the fluorescent material. It is reported that such a coating forms a substantially permanent bond and is not affected by use.

Rust-Removing Composition

LONG ISLAND CITY, N. Y.—A composition said to be suitable for removing rust from metals is described in a patent granted to an inventor here as having the following proportions:

	Parts
Phosphoric Acid	36
Zinc Phosphate	3
Gum Arabic	2
Manganese Chloride	1
Butyl Propionate	30
Water	28

U.S.I. Curtis Bay Plant Wins Two Safety Awards

BALTIMORE, Md.—Two special certificates of merit have been awarded by the Baltimore Safety Council to the Curtis Bay Plant of U.S. Industrial Chemicals, Inc., for the six months' period ending December 31, 1940.

One award was made to the plant personnel for having worked 292,647 employee-hours without a disabling injury. The second award was to the drivers for operating 47,963 miles without an accident.

Cement Deposits Homogeneous Film of Rubber and Neoprene

AKRON, Ohio—How cements containing both rubber and neoprene can be prepared in any desired proportions, without coagulation of the rubber or the neoprene, is revealed in a patent granted to an inventor here.

The method is said to consist in dissolving the rubber in gasoline and the neoprene in amyl acetate, butyl acetate, or butyl propionate, and then mixing the two solutions. The two solutions can be mixed, though it is impossible to dissolve a mixture of rubber and neoprene in a mixture of the two solvents, according to the patent.

Amyl Acetate, Butyl Acetate, and Butyl Propionate are produced by U.S.I.

March ★ U.S.I. CHEMICAL NEWS ★ 1941

Lithographic Solutions Kept Fresh with Thymol And Anhydrous Alcohol

PARK RIDGE, Ill.—That the gum arabic solutions used in etching lithographic plates can be preserved without decomposition for long periods of time is revealed in a patent granted to an inventor here.

Souring of gum arabic solutions, the inventor points out, results in making the lithographic plate grease-receptive instead of grease-repellent in the non-printing areas.

By dissolving a germicidal agent like thymol in anhydrous alcohol, it is possible to prepare a gum arabic solution that will not sour, the inventor claims.

U.S.I. is a leading producer of Anhydrous Alcohol.

U.S.I. Plant Facilities

(Continued from previous page)

consistently available material. This also holds true of ethyl acetate as compared to isopropyl acetate.

As the pioneer producer of industrial ethyl alcohol in the United States, U.S.I. has planned its research and development program with a view to anticipating the requirements of the users of alcohol and alcohol-derived chemicals, both in standards of quality and in production facilities. The contributions made by U.S.I. to the science of alcohol chemistry have resulted in continuous improvement of quality, lower cost to the buyer, and uniformity in meeting technical specifications. In addition, U.S.I. has played an important part in the development and commercial production of many of the important solvents, intermediates, and other chemicals derived from ethyl alcohol.

Plant Facilities

In the development of plant facilities and production processes, U.S.I.'s program has been directed toward prompt serving of its customers' needs. Manufacturing plants, employing the most modern methods for rapid volume production, are operated in four cities located in major industrial areas: Baltimore, Md., Newark, N. J., Anaheim, Calif. and New Orleans, La. In addition, alcohol stocks are maintained at warehouses in principal cities throughout the country. With these large-scale, strategically located production facilities and convenient warehouse stocks, U.S.I. is in a favorable position to serve the needs of government and industry.

Describes Way to Make Rubber Threads, Strips

PORTSLADE, England—A novel process for treating rubber threads, tapes, and strips in an alcohol bath is described in a patent granted to an inventor here and assigned to an American company. The process is said to reduce the tendency of the threads to stick together.

A typical procedure, according to the patent, is to extrude a mixture of latex and glue into a bath having the following proportions:

	Parts by weight
Ethyl Alcohol	1050
Water	1050
Ammonium Chloride	98
Zinc Sulphate	77
Sodium Chloride	77
Aluminum Sulphate	80

The bath, it is said, acts both as a coagulant and as a hardening bath. The presence of the aluminum sulphate in the bath is reported to inhibit the tendency of the threads to stick together.

Printing on Aluminum Foil

(Continued from previous page)

having higher boiling points, according to the patent. A suggested formula for a very thin coating has the following proportions:

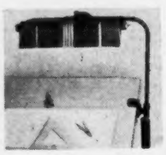
	Pounds
Shellac (commercially wax-free)	60
Denatured Alcohol (95%)	180
Butyl Alcohol	80
Butyl Acetate	80
Phosphoric Acid (10% of 85% acid in methyl alcohol)	24
Dibutyl Phthalate	3

The addition of the dibutyl phthalate is said to improve the adhesion of the ink, particularly in the presence of water. It is claimed that with this coating the phosphoric acid will not discolor the printing inks.

Denatured Alcohol, Butyl Alcohol, Butyl Acetate, and Dibutyl Phthalate are produced by U.S.I.

Artificial North Light

CHICAGO, Ill. — Close approximation to north daylight for drafting rooms is provided by a new fluorescent lighting source, according to a manufacturer here. It is said that the reflector is treated with a special pigment that tones down the bluish cast often encountered with fluorescent lights. The light is said to give cool illumination and to be easily adjustable.



TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A paint grinding aid is reported to allow substantial savings in mixing time and increased roller mill output, in addition to reductions in grinding time. Maker says that the aid is applicable to paste paints, flat whites, gloss enamels, and other products. **(No. 430)**

U S I

Galvanized sheets can be painted, varnished, lacquered, or enameled immediately without danger of cracking, peeling, or flaking, it is claimed. According to the manufacturer, the sheets are treated chemically and metallurgically to change the surface finish without weakening the protective value. **(No. 431)**

U S I

A corrosion-resisting paint is said to have a polyvinyl chloride base, to be liquid at room temperatures, to be extremely resistant to action of fumes and vapors of acids, alkalis, and salts. **(No. 432)**

U S I

A new casein product is described as consisting of casein dispersed with the aid of an aluminum salt. Product is in liquid form, and is said to be suitable for splash-proofing rayon and silk, especially in admixtures with wax, and to have good water-repellent properties in other types of goods. **(No. 433)**

U S I

A new photograph lacquer protects prints from dirt, mildew, abrasion, and atmospheric discoloration, allows them to be washed with soap and water, it is reported. Lacquer is said to be useful also for protecting leather, metal, and other substances. **(No. 434)**

U S I

A new flatting agent is reported to aid in preventing variations in consistency, to impart excellent brushability to the paint, to eliminate dust hazard. **(No. 435)**

U S I

A new soap is said to be useful in protecting workers from dermatitis and chapping. Maker states that it is non-abrasive, non-irritating, and high in bacteria removal. **(No. 436)**

U S I

Filters for corrosive fluids are said to be designed throughout to prevent contact between metal and corrosive. It is said that plates and frames are rubber-covered by the anodic process, and that piping, pump manifolding, valve and expansion chambers, and heads are rubber-lined. **(No. 437)**

U S I

A mixer-agitator is so designed that the mixing and agitating mechanisms can be operated together or independently of each other, it is reported. **(No. 438)**

U S I

A sanitary cleaner is reported to remove mold and organic matter and prevent contamination. Maker says that it can be used on any washable surface, is suitable for use in dairies, bottling plants, and other places. **(No. 439)**

further as plastics take over further fields formerly held by metals and alloys. Producers report heavy demand for cresols, cresylic acid, tar acids and creosote. The export markets are active to those countries where restrictions are not a factor.

Paint Materials

Record Spring Paint Season

In the past 4 weeks demand for raw paint materials has showed steady gains and paint manufacturers expect a record spring season; indeed a record year with sales to the government because of the national defense program at new high levels.

Casein prices turned bearish last month. Just what happens when casein prices go above certain levels has been illustrated by '40 imports which totaled 24,522,520 lbs., valued at $1,243,480 as against '39 imports of but 15,832,462 lbs., valued at $885,784. Higher freight rates are expected to force higher quotations for Argentine material.

Ethyl cellulose was lowered 2c to 45c in quantities of 5,000 lbs. or over. In smaller quantities the decline ranged from 1c to 3c. Alkali blue toner for dispersion in alkyd resins was reduced 5c. Acute demand for lead metal forced higher quotations for red lead and litharge. White lead was unchanged, but the entire price structure for lead pigments may go higher very shortly. Carbon black shipments are said to be heavier than present consumption. The Government was said to be buying large quantities of mercury oxides for anti-fouling paints.

Gums Quiet, Shellac Higher

Market for natural varnish gums was rather quiet and marking time. Glues were higher and stocks extremely scarce. Shellac prices soared when importers found great difficulty in booking space for shipments from Calcutta. Further increases are looked for in many well-informed quarters of the trade.

Naval Stores Decline

Turpentine prices slumped last month. Buyers were said to have temporarily withdrawn believing that price increases of the last two months had been too drastic. At the month-end main grades of gum rosin were officially quoted at Savannah well below loan values. This will undoubtedly lead to sharp increases in Government holdings. However, buyers are thought to have been drawing heavily on inventories for the past 60 days waiting for lower prices. A speed-up in buying and higher prices are now expected as a result of the usual spring increase in manufacturing operations plus the necessity of replenishing greatly reduced inventories.

Zinc Oxides Limited

Zinc is extremely scarce as a result of the Defense Program and priorities may be invoked at any moment. Some limiting of zinc oxide production has already taken place and still further curtailment is not unlikely.

Sharp Rise in Paint Sales

January sales paint, varnish, lacquer and fillers (680 establishments as reported by the Bureau of the Census) amounted to $34,604,629, as compared with $28,666,635 in the corresponding month of '40. Trade sales and industrial sales showed gains.

Crude Paraffins Move Higher

Petroleum chemical markets were featured last month by extremely heavy demand for crude paraffins and continued strength in prices of all grades of petroleum solvents with shipments showing still further increases. In certain sections producers of petroleum naphthas and solvents were experiencing some difficulties in making prompt shipments. Lighter fractions were not in such active demand but prices of such representative items as butane and propane were firm.

Demand for such solvents as acetone, amyl acetate, butyl alcohol, amyl alcohol, etc., was along broad lines. Producers continued to take care of contract requirements of regular consumers, leaving little for export. Great Britain and Canada, however, continue to take sizable shipments.

Denaturing Methanol Up 5c

Denaturing grade of natural methanol advanced in the middle of last month, first price change in a long period. New quotation is 45c in tanks, an increase of 5c a gallon. Glycerine remains firm but unchanged in price with shipments heavy. It is interesting to note that prices advanced 5s last month in Great Britain.

Fertilizers

Bone Materials Register Gains

Trading in fertilizer raw materials was routine with mixers limiting purchasing to fill-in requirements. Bone materials went higher when scarcity of imports from South America became evident and higher freight rates were reported. Movement in the natural ammoniates was somewhat mixed but most items in this classification lost ground in the 30-day period. Heavy demand continued for sulfate of ammonia for export. Stocks of the item continue extremely scarce.

Rainy weather in the South has held up planting somewhat and mixers are slightly behind in tonnage from what they expected, but this is viewed as temporary. Mixers in the North and Midwest are just about ready to go into the active manufacturing period.

February Fertilizer Sales Up

Upward trend in fertilizer sales continued in February with a sizable 19% increase reported for 17 states. Tax tag sales for the first two months of '41 reached 1,404,027 tons, highest level since '30 when 1,697,000 tons were reported sold in the two months.

In first 8 months of current fiscal year (July through February), tag sales in 17 states were 11% above same '39-'40 period, net result of a 10% gain in the South and a 17% increase in the Midwest. Sales were 15% larger than two years ago.

Future Outlook for Fertilizers

February sales were up in 9 southern states, with only minor declines in North Carolina, Georgia, and Louisiana. Heavy increases were reported in the Midwest. U. S. farmers in '40 experienced their best year since '37 from the standpoint of cash income. Total '40 cash farm income of $9,094,000,000 is the largest, with the exception of '37, since '29.

Cash income in '41 is expected to top 1940 level and to lead farmers to buy more fertilizer despite an expected further decline in cotton acreage as a result of restricted foreign markets and Government efforts to hold down production. Indicated cotton plantings are off 2% or 492,000 acres from '40 figure. Indicated acreage is 24,581,000 acres, according to the *Journal of Commerce*. Better demand for all farm products other than cotton is expected, according to the highly reliable *The Potash Journal*, to result in increased fertilizer usage on most crops other than cotton, and a net increase in national consumption over the '39-'40 season. Outlook is for 7,600,000-7,800,000 tons for the '40-'41 season at present writing.

Natural Raw Materials

Shipping Facilities Cause Concern

Gravity of the Far East situation, rising freight and war-risk insurance rates, and lack of ship bottoms were the important contributing factors aside from better demand here for advancing prices for Gambier, myrobalans, tumeric, sago flour, Chinawood oil, coconut oil, perilla oil, wattlebark and a number of other natural raw materials. Importers are pessimistic over the future outlook. It is difficult to expect that the Far East situation will improve—all signs point to it becoming rapidly more acute.

According to reports cutch will be advanced on April 1. Egg products during the period under review were in good

demand with prices firm but unchanged. Of interest is a bill (H. R. 2826) in Congress providing taxes on imported egg products. Starch derivatives held firmly also after a 5c decline early in the month. Annatto with a ½c decline was one of the few items on the downward side. Prices of the item at the month-end ranged between 6-6½c.

Chinawood Offerings Light

Fats and oils markets were featured by an advance in drum price of dehydrated castor oil. With Chinawood high and scarce, use of dehydrated castor in the coatings field is gaining momentum. New prices for the item are 13.2c in carlots, 13.6c in l.c.l. quantities. Tanks hold at 12½c. Another feature was the withdrawal of quotations on crude coconut—the result of the uncertainties in the Pacific. Last sales were around 3½c and copra quotations were nominal at the month-end. Scarcity of offerings of crude menhaden and sardine in the face of improved demand sent prices for crude and refined grades of both of these important fish oils into higher brackets.

Decline in Carnauba Features Waxes

Carnauba quotations did some queer antics last month. Net result was quite a drop from the extreme highs of January. Several reasons were advanced for this action including the story that the banks were pressing Brazilian shippers. In some quarters, however, further advances were said to be likely, caused by the impending increases in South American freight rates. Japan wax prices slipped. Demand was light and stocks are said to be larger as a result of recent arrival of shipments long overdue.

Outlook for 2nd Quarter

Practically every experienced person in the chemical industry looks for still further increases in production and shipments in the 2nd quarter. While no wholesale price advances are anticipated, it is expected that the price structure will move up still further. Certainly no "summer dullness" is expected in the June-September period. Passage of the Lease-Lend Bill is expected to provide still further impetus to industrial activity.

Foreign Literature Digest

(Continued from page 336)

same purposes. Russian investigators obtained aminocymol in 70% yield by treating cymol with sulfur in an autoclave under a pressure of 40 atmospheres. Since it is a homologue of aniline it can replace the latter in the synthesis of dyes. Cymol can be used extensively as a solvent for lacquers, resins, etc. It is an excellent raw material for various organic syntheses, such as dyes, perfumes, pharmaceuticals (carvacrol, thymol), halide derivatives (for synthetic resins), phthalic acid, etc.

The formation of cymol during sulfite digestion is explained and described. Various investigators have reported differently on the yield of cymol per ton of cellulose. Observations at a Soviet plant in 1937 showed that 0.25 kg. of cymol per ton of cellulose was collected. At another plant, in 1938, it was found that 0.1 kg. of cymol was collected per ton of cellulose. In 1939, it was found that the average at both plants was 0.6 kg. per ton. TAPPI reports 1.2-3.8 liters of sulfite oil per ton of cellulose. A diagrammatic graph gives the comparative cymol content of various sulfite oils under different conditions. The properties of a given sulfite oil which depend on its cymol content, are described. The sulfite oil is injurious to the cellulose being digested and must be removed. It is also injurious to paper pulp machinery. The cymol dissolves resins and produces a gummy mass which is distributed thruout the machine and clogs it up. The article ends with an excellent bibliography on all the processes and facts mentioned.

Heavy Chemicals, Coal-Tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

PRICES CURRENT

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.*

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1940 Average $1.20 - Jan. 1941 $1.16 - Feb. 1941 $1.17

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Acetaldehyde, drs, c-l, wks lb.	...	.11	...	.11	...	.11
Acetaldol, 95%, 55 gal drs wks lb.	.11	.12	.11	.12	.11	.25
Acetamide, tech, lcl, kgs lb.	.28	.30	.28	.30	.28	.50
Acetanilid, tech, 150 lb bbls lb.	.29	.31	.29	.31	.27	.31
Acetic Anhydride, drs, f.o.b. wks, frt all'd lb.	.10½	.11½	.10½	.11½	.10½	.11½
Acetin, tech, drs lb.	...	.33	...	.33	...	.33
Acetone, tks, f.o.b. wks, frt all'd lb.	...	.06	...	.06	.05	.06
drs, c-l, f.o.b. wks, frt all'd lb.	...	.07½	...	.07½	.06½	.07½
Acetyl chloride, 100 lb cbys lb	.55	.68	.55	.68	.55	.68
Acetic, 28%, 400 lb bbls, c-l, wks 100 lbs.	...	2.23	...	2.23	...	2.23
glacial, bbls, c-l, wks 100 lbs.	...	7.62	...	7.62	...	7.62
glacial, USP bbls, c-l, wks 100 lbs.	...	10.25	...	10.25	...	10.25
Acetic Acid Glacial, *Synthetic* 99.5%, cbys, cases, delv lb.	...	.0918	...	.0918	...	...
99.5%, 110-gal dr, delv lb.	.0843	.0868	.0843	.0868	...	...
USP XI, cases, cbys, delv lb.	.1025	.11	.1025	.11	...	...
USP XI, 110-gal drs, delv lb.	.10¼	.11	.10¼	.11	...	...
CP, cases, cbys, delv lb.	.13½	.14	.13½	.14	...	...
CP, 55-gal drs, delv lb.	.13¼	.13½	.13¼	.13½	...	...
Acetylsalicylic, USP, 225 lb. bbls lb.	...	.45	...	.45	...	.45
Adipic, kgs, bbls lb.	...	.31	...	.31	.31	.72
Anthranilic, ref'd, bbls lb.	1.15	1.20	1.15	1.20	1.15	1.20
tech bbls lb.	...	.75	...	.75	...	.75
Ascorbic, bot oz.	2.00	2.05	2.00	2.05	2.25	3.00
Battery, cbys, wks 100 lbs.	1.60	2.55	1.60	2.55	1.60	2.55
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bulk-bgs, delv ton *a*	93.50	96.00	93.50	96.00	...	96.00
Broenner's, bbls lb.	...	1.11	...	1.11	...	1.11
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Caproic, normal, drs lb.	.30	.35	.30	.35	.35	.40
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs. wks lb.	.03½	.05	03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.15¼	.17¼	.15¼	.17¼	.15¼	.17¼
Citric, USP, crys, 230 lb bbls. lb. *b*	.20	.21	.20	.21	.20	.21½
anhyd, gran bbls lb. *b*	...	.23	...	.23	...	.23
Cleve's, 250 lb bbls lb.	...	.57	...	.57	...	.57
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	.68	.70	.68	.70	.68	.70
99%, straw, LB, drs, wks, frt equal gal.	.68	.70	.68	.70	.68	.75
resin grade, drs, wks, frt equal lb.	.08¾	.09¾	.08¾	.09¾	.08¾	.09¾
Crotonic, bbls, delv lb.	.21	.50	.21	.50	.21	.50
Formic, tech, 140 lb drs lb.	.10½	.11½	.10½	.11½	.10½	.11½
Fumaric, bbls lb.	.24	.28	.24	.28	.24	.75
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls lb.	.90	.93	.90	.93	.75	.93
USP, bbls lb.	.92	.95	.92	.95	.92	.95
H, 225 lb bbls, wks lb.	...	.45	...	.45	...	.45
Hydriodic, USP 47% lb.	...	2.42	...	2.42	2.30	2.42
Hydrobromic, 34% conct 155 lb cbys, wks lb.	.35	...	.35	...	.35	.44
Hydrochloric, see muriatic						
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.06	.06½	.06	.06½	.06	.06½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.09	.09¼	.09	.09¼	.09	.09½
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.03¾	.02½	.03¾	.02½	.03¾
22%, light ref'd, bbls lb.	.03½	.04¾	.03½	.04¾	.03½	.04¾
44%, light, 500 lb bbls lb.	.06½	.07¼	.06½	.07¼	.06½	.07¾
44%, dark, 500 lb bbls lb.	.05½	.06¾	.05½	.06¾	.05½	.06¾
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.11½
Lauric, drs lb.	.12	.12½	.12	.12½	.12	.14½
Laurent's, 250 lb bbls lb.	...	.45	...	.45	.45	.46
Maleic, powd, kgs lb.	...	.30	...	.30	.30	.40
Malic, powd, kgs lb.	...	.47	...	.47	...	.47
Mixed, tks, wks N unit	.05	.06	.05	.06	.05	.07¼
S unit	.0085	.009	.0085	.009	.008	.009
Monochloracetic, tech, bbls lb.	.15	.18	.15	.18	.15	.18
Monosulfonic, bbls lb.	...	1.50	...	1.50	1.50	1.60

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls; *y* Price given is per gal.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Muriatic, 18°, 120 lb cbys, c-l, wks 100 lb.	...	1.50	...	1.50	...	1.50
tks, wks 100 lb.	...	1.05	...	1.05	1.00	1.05
20°, cbys, c-l, wks 100 lb.	...	1.75	...	1.75	...	1.75
tks, wks 100 lb.	...	1.15	...	1.15	1.10	1.15
22°, c-l, cbys, wks 100 lb.	...	2.25	...	2.25	...	2.25
tks, wks 100 lb.	...	1.65	...	1.65	1.60	1.65
CP, cbys lb.	.06½	.08	.06½	.08	.06½	.08
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	nom.	.10	nom.	nom.	.14
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.13	.11½	.13	.11½	.13
Oxalic, 300 lb bbls, wks, or N Y lb.	.10¾	.12	.10¾	.12	.10¾	.12
Phosphoric, 85%, USP, cbys lb.	...	.12	...	.12	.12	.14
50%, acid, c-l, drs, wks lb.	...	.12	...	.12	.06	.12
75%, acid, c-l, drs, wks lb.	...	.07½	...	.07½	...	.07½
Picric, kgs, wks lb.	...	.35	...	.35	.35	.40
Propionic, 98% wks, drs lb.	...	.25	...	.25	...	.25
80% lb.	...	.14	...	.14	.14	.20
Pyrogallic, tech, lump, pwd, bbls lb.	...	1.20	...	1.20	1.05	1.20
cryst, USP lb.	1.70	2.25	1.70	2.25	1.55	2.25
Ricinoleic, bbls lb.	.27	.33	.27	.33	.27	.33
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.33
USP, bbls lb.	.35	.40	.35	.40	.35	.40
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	...	.17	...	.17	.17	.18
Sulfuric, 60°, tks, wks ton	...	13.00	...	13.00	...	13.00
c-l, cbys, wks 100 lb.	...	1.25	...	1.25	...	1.25
66°, tks, wks ton	...	16.50	...	16.50	...	16.50
c-l, cbys, wks 100 lb.	...	1.50	...	1.50	...	1.50
CP, cbys, wks lb.	.06½	.08	.06½	.08	.06½	.08
Fuming (Oleum) 20% tks, wks ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls lb.	.54	.56	.54	.56	.44	.56
Tartaric, USP, gran, powd, 300 lb bbls lb.	.57½	.58	.46¼	.58	.35¼	.46¼
Tobias, 250 lb bbls lb.	.55	.60	.55	.60	.55	.60
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls lb.	no prices		no prices		no prices	
Albumen, light flake, 225 lb. bbls lb.	.55	.62	.55	.62	.55	.62
dark, bbls lb.	.13	.18	.13	.18	.13	.18
egg, edible lb.	.65	.68	.65	.68	.53	.65
Alcohol, Amyl (from Pentane) tks, delv lb.	...	.111	...	.111	...	.111
c-l, drs, delv lb.	...	.121	...	.121	...	.121
lcl, drs, delv lb.	...	.131	...	.131	...	.131
Amyl, normal l-c-l drs Wyandotte, Mich. lb.	...	.25	...	.25	...	.25
secondary, tks, delv lb.						
drs, c-l, delv E of Rockies lb.	...	.09½	...	.09½	...	.09½
tertiary, rfd, l-c-l, drs, f.o.b., Wyandotte, frt all'd lb.	...	.09	...	.09	...	.09
Benzyl, cans lb.	...	.68	...	.68	.68	1.00
Butyl, normal, tks, f.o.b. wks, frt all'd lb. *d*	...	.09	...	.09	...	.09
c-l, drs, f.o.b. wks, frt all'd lb. *d*	...	.10	...	.10	...	.10
Butyl, secondary, tks, delv lb. *d*	...	.07¼	...	.07¼	...	.07¼
c-l, drs, delv lb. *d*	...	.08¼	...	.08¼	...	.08¼
Butyl, tert denat cl drs lb.	...	.12½	...	.12½	...	...
lcl drs lb.	...	.13	...	.13	...	...
tks lb.	...	.11½	...	.11½	...	...
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	2.00	2.50	2.00	2.50	2.00	2.50
Denatured, CD, 14, c-l drs, wks gal. *e*	.32½	.37½	.32½	.37½	.32½	.36½
tks, East, wks gal.	...	.26½	...	.26½	.25½	.26½
Western schedule, c-l, drs, wks gal. *e*	...	.37½	...	.37½	.34½	.37½
Denatured, SD, No. 1, tks,	...	.24½	...	.24½	.23½	.24½

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher: *e* Anhydrous is 5c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Prices Current

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Alcohols (continued):						
Diacetone, pure, c-lfi drs, delv ....lb. *f*	...	.09½	...	.09½	...	.12
tech, contract, drs, c-l, delv ....lb.	...	.09	...	.09	...	.11½
Ethyl, 190 proof, molasses, tks ....gal. *g*	...	5.94½	...	5.94½	5.93½	5.94½
c-l, drs ....gal. *g*	...	6.00½	...	6.00½	5.92½	6.00½
c-l, bbls ....gal. *g*	...	6.01½	...	6.01½	6.00½	6.01½
Furfuryl, tech, 500 lb drs lb.	.20	.25	.20	.25	.25	.35
Hexyl, secondary tks, delv lb.	...	.12	...	.12	...	.12
c-l, drs, delv ....lb.	...	.13	...	.13	...	.13
Normal, drs, wks ....lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delv ....lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs ..lb.	...	.079	...	.079	...	.079
c-l, drs ....lb.	...	.069	...	.069	...	.069
tks ....lb.	...	.069	...	.069	...	.069
Isopropyl, ref'd, 91%, c-l, drs, f.o.b. wks, frt all'd ....lb.	...	.66½	...	.66½	...	.65
Ref'd 98%, drs, f.o.b. wks, frt all'd ....gal.	...	.65	...	.65	...	.65
Tech 91%, drs, above terms ....gal.	.35	.40	.35	.40	...	.33½
tks, same terms ....gal.	...	.30	...	.30	...	.28½
Tech 98%, drs, above terms ....gal.	..	.36	...	.36	.36	.37½
tks, above terms ...gal.	...	.31	...	.31	.31	.32½
Spec. Solvent, tks, wks gal.	...	.25½	...	.25½	.23½	.25½
Aldehyde ammonia, 100 gal drs ....lb.	.65	.70	.65	.70	.65	.82
Aldehyde Bisulfite, bbls, delv ....lb.	...	.17	...	.17	...	.17
Aldol, 95%, 55 and 110 gal, drs, delv ....lb.	.11	.12	.11	.12	.11	.12
Alphanaphthol, crude, 300 lb. bbls ....lb.	...	52	...	.52	...	.52
Alphanaphthylamine, 350 lb bbls ....lb.	...	.32	...	.32	.32	.34
Alum, ammonia, lump, c-l, bbls, wks ....100 lb.	...	3.75	...	3.75	...	3.75
delv NY, Phila ...100 lb.	...	3.75	...	3.75	...	3.75
Granular, c-l, bbls wks ....100 lb.	...	3.50	...	3.50	...	3.50
Powd, c-l, bbls, wks 100 lb.	...	3.90	...	3.90	...	3.90
Chrome, bbls ....100 lb.	no prices		no prices		6.50	6.75
Potash, lump, c-l, bbls, wks ....100 lb.	...	4.00	...	4.00	...	4.00
Granular, c-l, bbls, wks ....100 lb.	...	3.75	...	3.75	...	3.75
Powd, c-l, bbls, wks 100 lb.	...	4.15	...	4.15	...	4.15
Soda, bbls, wks ....100 lb.	...	3.25	...	3.25	...	3.25
Aluminum metal, c-l, NY 100 lb.	...	18.00	...	18.00	18.00	20.00
Acetate, 20%, bbls ....lb.	.08	.09	.08	.09	.07½	.09
Basic powd, bbls, delv lb.	.35	.50	.35	.50	.35	.50
32% basic, bbls, delv lb.	.09½	.12	.09½	.12	...	...
Insoluble basic powder, bbls, delv ....lb.	.35	.40	.35	.40	...	...
Soluble normal pwdr lb.	...	.22	...	.22	...	...
Soluble basic powder lb.	...	.33	...	.33	...	...
Chloride anhyd 99% wks lb.	.08	.12	.08	.12	.08	.12
93%, wks ....lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06½	.06	.06½	.06	.06½
Solution, drs, wks ...lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv ....lb.	...	.13	...	.13	...	.13
Hydrate, 96%, light, 90 lb. bbls, delv ....lb.	.12½	.13	.12½	.13	.12½	.13½
heavy, bbls, wks ....lb.	.029	.03½	.029	.03½	.029	.03½
Oleate, drs ....lb.	.17½	.20	.17½	.20	.16¾	.20
Palmitate, bbls ....lb.	.20½	.21½	.20½	.21½	.20½	.24½
Resinate, pp., bbls ....lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls ...lb.	.18	.19	.18	.19	.19	.20
Sulfate, com, c-l, bgs, wks ....100 lb.	...	1.15	...	1.15	...	1.15
c-l, bbls, wks ....100 lb.	...	1.35	...	1.35	...	1.35
Sulfate, iron-free, c-l, bags, wks ....100 lb.	...	1.60	...	1.60	1.60	1.80
c-l, bbls, wks ....100 lb.	...	1.80	...	1.80	1.65	1.80
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd fert com, tks lb.	.04½	.05	.04½	.05	.04½	.05
Ammonia anhyd, 100 lb cyl lb.	...	.16	...	.16	...	.16
50 lb cyl ....lb.	...	.22	...	.22	...	.22
26°, 800 lb drs, delv ...lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH_3 ..cont.	.04	.05¼z	.04	.05¼z	.04	.05¼
Ammonium Acetate, kgs ..lb.	.27	.33	.27	.33	.27	.33
Bicarbonate, bbls, f.o.b. wks ....100 lb.	...	.0564	...	.0564	...	.0564
Bifluoride, 300 lb bbls ..lb.	.14½	.16½	.14½	.16½	.14½	.16½
Carbonate, tech, 500 lb bbls ....lb.	.08¼	.09¼	.08¼	.09¼	.08¼	.11
Chloride, White, 100 lb bbls, wks ....100 lb.	4.45	...	4.45	...	4.45	4.90
Gray, 250 lb bbls, wks ....100 lb.	5.50	5.75	5.50	5.75	5.50	6.25
Lump, 500 lb cks spot lb.	no prices		no prices		no prices	
Lactate, 500 lb bbls ....lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls ....lb.	...	.23	...	.23	...	.23
Linoleate, 80% anhyd, bbls ....lb.	...	.12	...	.12	...	.12
Naphthenate, bbls ....lb.	...	.17	...	.17	...	.17
Nitrate, tech, bbls ....lb.	...	.0455	...	.0455	...	.0455
Oleate, drs ....lb.	...	.14	...	.14	...	.14
Oxalate, neut, cryst, powd, bbls ....lb.	.19	.25	.19	.25	.19	.25
Perchlorate, kgs ....lb.	no stocks		no stocks		no stocks	
Persulfate, 112 lb kgs ..lb.	.21	.22	.21	.22	.21	.22

f Prices are 1c higher in each case.
g Grain alcohol 25c a gal. higher in each case. ** On a delv. basis.
z On a f.o.b. wks. basis.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Ammonium (continued):						
Phosphate, diabasic tech, powd, 325 lb bbls ....lb.	.07¼	.09¼	.07¼	.09¼	.07¼	.10
Ricinoleate, bbls ....lb.	...	.15	...	.15	...	.15
Stearate, anhyd, bbls ..lb.	...	.24½	...	.24½	...	.24½
Paste, bbls ....lb.	...	.06½	...	.06½	...	.06½
Sulfate, dom, f.o.b., bulk ton	29.00	30.00	29.00	30.00	...	29.00
Sulfocyanide, pure, kgs ..lb.	...	.65	...	.65	...	.65
Amyl Acetate (from pentane) tks, delv ....lb.	...	.105	...	.105	...	.105
c-l, drs, delv ....lb.	...	.115	...	.115	...	.115
lcl, drs, delv ....lb.	...	.125	...	.125	...	.125
tech drs, delv ....lb.	...	.11½	.11½	.12	...	.12
Secondary, tks, delv ..lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv ....lb.	...	.09½	...	.09½	...	.09½
tks, delv ....lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks ....lb.	.0565	.0665	.0565	.0665	.0535	.0665
tks, wks ....lb.	...	.0465	...	.0465	...	.0465
Mercaptan, drs, wks ...lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs ..lb.	...	.25	...	.25	...	.25
Stearate, lcl, wks, drs ..lb.	...	.26	...	.26	...	.26
Amylene, drs, wks ....lb.	.102	.11	.102	.11	.102	.11
tks, wks ....lb.	...	.09	...	.09	...	.09
Amylnaphthalenes, see Mixed Amylnaphthalenes						
Aniline Oil, 960 lb drs and tks ....lb.	...	.14½	...	.14½	...	.14½
Annatto fine ....lb.	.34	.39	.34	.39	.34	.39
Anthracene, 80-85% ....lb.	...	.55	...	.55	...	.55
Anthraquinone, sublimed, 125 lb bbls ....lb.	...	.65	...	.65	...	.65
Antimony metal slabs, ton lots ....lb.	.14	nom.	.14	nom.	...	.14
Butter of, see Chloride						
Chloride, soln, cbys ....lb.	...	.17	...	.17	...	.17
Needle, powd, bbls ....lb.	...	.16	...	.16	.16	.22
Oxide, 500 lb bbls ....lb.	.12	.14½	.12	.14½	.13	.15¾
Salt, 63% to 65%, drs lb.	...	.28	...	.28	.28	nom.
Archil, conc, 600 lb bbls lb.	no prices		no prices		no prices	
Double, 600 lb bbls ....lb.	no prices		no prices		no prices	
Aroclors, wks ....lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbls ....lb.	.09½	.10	.09½	.10	.09	.10
Arsenic, Metal ....lb.	no prices		no prices		...	...
Red, 224 lb cs kgs ....lb.	no prices		no prices		.17½	.18
White, 112 lb kgs ....lb.	.03½	.04¼	.03½	.04¼	.03	.04¼
Barium Carbonate precip, 200 lb bgs, wks ....ton	45.00	50.00	45.00	50.00	45.00	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ....ton	...	43.00	...	43.00	43.00	47.00
Chlorate, 112 lb kgs, NY lb.	...	.45	...	.45	.20	.45
Chloride, 600 lb bbls, delv, zone 1 ....ton	77.00	92.00	77.00	92.00	77.00	92.00
Dioxide, 88%, 690 lb drs lb.	...	.10	...	.10	.10	.12
Hydrate, 500 lb bbls ...lb.	.05½	.07	.05½	.07	.05½	.07
Nitrate, bbls ....lb.	.08½	.10½	.08½	.10½	.09½	.10½
Barytes, floated, 350 lb bbls c-l, wks ....ton	...	25.15	...	25.15	...	25.15
Bauxite, bulk, mines ....ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ....ton	...	16.00	...	16.00	...	16.00
200 mesh ....ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb. drs, wks ....lb.	.45	.50	.45	.50	.55	.60
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	...	.14	...	.14	.14	.16
90% c-l, drs ....gal.	...	.19	...	.19	.19	.21
Ind pure, tks, frt all'd gal.	...	.14	...	.14	.14	.16
Benzidine Base, dry, 250 lb. bbls ....lb.	...	.70	...	.70	...	.70
Benzoyl Chloride, 500 lb drs lb.	.23	.28	.23	.28	.23	.28
Benzyl Chloride, 95-97% rfd, drs ....lb.	.19	.21	.19	.21	.19	.21
Beta-Naphthol, 250 lb bbls, wks ....lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls ....lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ....lb.	.51	.52	.51	.52	.51	.52
Bismuth metal ....lb.	...	1.25	...	1.25	...	1.25
Chloride, boxes ....lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes ....lb.	3.35	3.46	3.35	3.46	3.35	3.46
Oxychloride, boxes ....lb.	...	3.10	...	3.10	...	3.10
Subbenzoate, boxes ....lb.	...	3.36	...	3.36	3.25	3.36
Subcarbonate, kgs ....lb.	1.73	1.76	1.73	1.76	1.73	1.76
Subnitrate, fibre, drs ...lb.	1.48	1.51	1.48	1.51	1.48	1.51
Trioxide, powd, boxes ..lb.	...	3.56	...	3.56	3.56	3.57
Blanc Fixe, Pulp, 400 lb. bbls, wks ....ton *h*	35.00	42.50	35.00	42.50	50.00	80.00
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	2.00	2.85	2.00	2.85	...	2.85
lcl, drs, wks ....lb.	2.25	3.35	2.25	3.35	2.25	3.35
Blood, dried, f.o.b., NY unit	...	2.65	2.40	2.75	2.25	3.35
Chicago, high grade ..unit	...	2.75	2.50	3.00	2.00	3.50
Imported shipt ....unit	...	2.55	2.45	2.50	2.25	3.30
Blues, Bronze Chinese						
Prussian Soluble ....lb.	...	.33	...	.33	.33	.37
Milori, bbls ....lb.	.33	.34	.33	.34	.33	.34
Ultramarine,* dry, wks, bbls ....lb.	...	.11	...	.11	...	.11
Regular grade, group 1 lb.	...	.16	...	.16	...	.16
Pulp, Cobalt grade ...lb.	.22	.24	.22	.24	.22	.27
Bone, 4½ + 50% raw, Chicago ....ton	...	32.50	30.00	33.00	30.00	33.00
Bone Ash, 100 lb kgs ....lb.	.06	.07	.06	.07	.06	.07
Meal, 3% & 50%, imp ton	...	33.00	31.50	33.00	31.50	32.50
Domestic, bgs, Chicago ton	33.00	35.00	32.00	35.00	29.00	32.00

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; *Freight is equalized in each case with nearest producing point.

Prices Current

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Borax, tech, gran, 80 ton lots, sacks, delv ....ton *i*	...	43.00	...	43.00	...	43.00
bbls, delv ....ton *i*	...	53.00	...	53.00	...	53.00
Tech, powd, 80 ton lots, sacks ....ton	...	48.00	...	48.00	47.00	48.00
bbls, delv ....ton	...	58.00	...	58.00	57.00	58.00
Bordeaux Mixture, drs ...lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ....lb.	.25	.30	.25	.30	.25	.43
Bronze, Al, pwd, 300 lb drs lb.	...	.57	...	.57	...	.57
Gold, blk ....lb.	.60	.65	.60	.65	.60	.65
Butanes, com 16-32° group 3 tks ....lb.	.02½	.03	.02½	.03	.02¼	.03¾
Butyl, acetate, norm drs, frt all'd ....lb.	...	.10	...	.10	...	.10
tks, frt all'd ....lb	...	.09	...	.09	...	.09
Secondary, tks, frt all'd lb.	...	.07¼	...	.07¼	...	.07¼
drs, frt all'd ....lb.	.08¼	.08¾	.08¼	.08¾	.07½	.08
Aldehyde, 50 gal drs, wks ....lb.	.15½	.17½	.15½	.17½	.15½	.17½
Carbinol, norm (see Normal Amyl Alcohol)						
Crotonate, norm, 55 and 110 gal drs, delv .....lb.	...	.35	...	.35	...	.35
Lactate ....lb.	...	.23½	...	.23½	.23½	.24½
Oleate, drs, frt all'd ...lb.	...	.25	...	.25	...	.25
Propionate, drs ....lb.	.16½	.17	.16½	.17	.16½	.17
tks, delv ....lb.	...	.15½	...	.15½	...	.15½
Stearate, 50 gal drs ....lb.	...	.28½	...	.28½	...	.28½
Tartrate, drs ....lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	...	.35½
Cadmium Metal ....lb.	.85	.90	.80	.90	.80	.85
Sulfide, orange, boxes ..lb.	...	.75	...	.75	.75	.85
Calcium, Acetate, 150 lb bgs c-l, delv ....100 lb.	...	1.90	...	1.90	...	1.90
Arsenate, c-l, E of Rockies, dealers, drs ....lb.	.06	.06½	.06	.06½	.06	.07¼
Carbide, drs ....lb.	...	.04¾	...	.04¾	.05	.06
Carbonate, tech, 100 lb bgs, c-l ....ton	16.00	20.00	16.00	20.00	...	...
Chloride, flake, 375 lb drs, burlap bgs, c-l, delv..ton	...	20.50	...	20.50	...	22.00
paper bags, c-l, delv..ton	20.50	35.00	20.50	35.00	20.50	36.00
Solid, 650 lb drs, c-l, delv ....ton	19.00	33.00	19.00	33.00	19.00	35.00
Ferrocyanide, 350 lb bbls wks ....lb.	...	.20	...	.20	...	.20
Gluconate, Pharm, 125 lb bbls ....lb.	.50	.57	.50	.57	.50	.57
Levulinate, less than 25 bbl lots, wks ....lb.	...	3.00	...	3.00	...	3.00
Nitrate, 100 lb bags ...ton	no prices		no prices		28.00	29.00
Palmitate, bbls ....lb.	.22	.24	.22	.24	.22	.24
Phosphate, tribasic, tech, 450 lb bbls ....lb.	.0635	.0705	.0635	.0705	.0635	.07½
Resinate, precip, bbls ..lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ...lb.	.20½	.22½	.20½	.22½	.20½	.22½
Camphor, slabs ....lb.	.82	.83	.82	.83	.82	.84
Powder ....lb.	.82	.83	.82	.83	.82	.84
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Black, c-l, bgs, f.o.b. plants ....lb.	...	.03075	...	.03075	.02¾	.03¾
lcl, bgs, f.o.b. whse ..lb.	...	.07025	...	.07025	...	.06525
Decolorizing, drs, c-l ..lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 55 or 110 gal drs, c-l, delv ....lb.	...	.66½	...	.66½	...	.66½
Casein, Standard, Dom, grd lb.	.11½	.13	.11½	.13¾	.10	.14½
80-100 mesh, c-l bgs ...lb.	.12	.13½	.12	.14	.11	.15
Castor Pomace, 5½ NH_3, c-l, bgs, wks ....ton	15.00	...	15.00	...	15.00	17.50
Imported, ship, bgs ....ton	no prices		no prices		...	20.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.12	.15
Transparent, cs ....lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, frt all'd, 50 lb kgs ....lb.	...	.30	...	.30	.30	.34
Triacetate, flake, frt all'd ....lb.	...	.30	...	.30	...	...
Chalk, dropped, 175 lb bbls lb.	...	.02¾	...	.02¾	.02¾	.03¾
Precip, heavy, 560 lb cks lb.	...	.03¼	...	.03¼	.02¾	.03¼
Light, 250 lb cks ......lb.	...	.03¼	...	.03¼	.03¼	.04
Charcoal, Hardwood, lump, blk, wks ....bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* ..ton	25.00	36.00	25.00	36.00	25.00	36.00
Willow, powd, 100 lb bbls, wks ....lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified tks, wks lb.	...	.01¾	...	.01¾	...	.01¾
25%, bbls, wks ....lb.	...	.02⅜	...	.02⅜	...	.02½
China Clay, c-l, blk mines ton	...	7.60	...	7.60	7.60	9.50
Imported, lump, blk ...ton	no prices		no prices		...	26.00
Chlorine, cyls, lcl, wks, contract ....lb.	...	.07¼	...	.07¼	.07½	.08½
cyls, c-l, contract ...lb *j*	...	.05¼	...	.05¼	...	.05¼
Liq. tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Multi, c-l, cyls, wks, cont ....lb.	...	.019	...	.019	...	.019
Chloroacetophenone, tins, wks ....lb.	3.00	3.50	3.00	3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb. drs, lcl, wks ....lb.	.06	.08	.06	.08	.06	.08
Chloroform, tech, 1000 lb drs ....lb.	...	.20	...	.20	.20	.21
USP, 25 lb tins ....lb.	...	.30	...	.30	.30	.31
Chloropicrin, comml cyls ..lb.	...	.80	...	.80	...	.80
Chrome, Green, CP ......lb.	.21	.25	.21	.25	.21	.25
Yellow ....lb.	.13½	.14½	.13½	.14½	.13½	.14½
Chromium Acetate, 8% Chrome, bbls ....lb.	...	.05¾	...	.05¾	...	.05¾

j A delivered price; * Depends upon point of delivery.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Chromium (continued)						
Fluoride, powd, 400 lb bbl ....lb.	.27	.28	.27	.28	.27	.28
Coal tar, bbls ....bbl.	7.50	7.75	7.50	7.75	7.50	8.00
Cobalt Acetate, bbls ......lb.	...	.80½	...	.80½	...	.80½
Carbonate tech, bbls ...lb.	...	1.58	...	1.58	1.38	1.60
Hydrate, bbls ....lb.	...	1.98	...	1.98	...	1.78
Linoleate, solid, bbls ...lb.	...	.33	...	.33	...	.33
paste, 6%, drs ......lb.	...	.31	...	.31	...	.31
Oxide, black, bgs ......lb.	...	1.84	...	1 84	...	1.84
Resinate, fused, bbls ...lb.	...	.13½	...	13½	...	.13½
Precipitated, bbls .....lb.	...	.34	...	.34	...	.34
Cochineal, gray or bk bgs lb.	.37	.38	.37	.38	.37	.38
Teneriffe silver, bgs ....lb.	.38	.39	.38	39	.38	.39
Copper, metal, electrol 100 lb.	...	12.00	...	12.00	11.00	12.00
Acetate, normal, bbls, dlvd ....lb.	...	.24	.22	.24	.22	.24
Carbonate, 52-54% 400 lb bbls ....lb.	...	.1650	...	.1650	.1570	.169
Chloride, 250 lb bbls ...lb.	...	.16	...	.16	.16	.18
Cyanide, 100 lb drs ....lb.	...	.34	...	.34	...	.34
Oleate, precip, bbls ....lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks lb.	...	.18	...	.18	.18	.18¾
red 100 lb bbls ......lb.	...	.20½	...	.20½	.19½	.20½
Sub-acetate verdigris, 400 lb bbls ....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks, 100 lb.	...	4.75	...	4.75	4.45	4.75
Copperas crys and sugar bulk c-l, wks ....ton	14.00	15.00	14.00	15.00	14.00	20.00
Corn Sugar, tanners, bbls 100 lb.	...	3.95	3.36	3.95	2.99	3.39
Corn Syrup, 42°, bbls 100 lb.	...	3.42	3.42	3.47	3.02	3.47
43°, bbls ....100 lb.	...	3.47	3.47	3.52	3.07	3.52
Cotton, Soluble, wet 100 lb. bbls ....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran 300 lb bbls ....lb.	.47½	.48	.38¼	.48	.28¼	.38¼
Creosote, USP 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1 tks .....gal.	.13½	.14	.13½	.14	.13½	.14
Grade 2 ....gal.	.122	.132	.122	.132	.122	.132
Cresol, USP, drs ....lb.	.09¾	.10¼	.09¾	.10¼	.09¾	.10¼
Crotonaldehyde, 97%, 55 and 110 gal drs, wks .....lb.	...	.13	.11	.13	.11	.12
Cutch, Philippine, 100 lb. bale lb.	...	.04½	...	.04½	.04	.04½
Cyanamid, pulv, bags, c-l, frt all'd, nitrogen basis, unit	...	1.40	...	1.40	...	1.40
Derris root 5% rotenone, bbls ....lb.	.21	.23	.21	.23	.21	.30
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	...	3.80	3.80	3.85	3.40	3.80
British Gum, bgs ...100 lb.	...	4.05	4.05	4.10	3.65	4.10
Potato, Yellow, 220 lb bgs lb.	...	.07¾	...	.07¾	...	.07¾
White, 220 lb bgs, lcl lb.	.08½	.09	.08½	.09	.08½	.09
Tapioca, 200 bgs, lcl ...lb.	...	.0715	...	.0715	...	.0715
White, 140 lb. bgs ..100 lb.	...	3.75	3.75	3.80	3.35	3.75
Diamylamine, c-l, drs, wks lb.	...	.47	...	.47	...	.47
lcl drs, wks ....lb.	...	.50	.48	.50	...	.50
Diamylene, drs, wks .....lb.	.095	.102	.095	.102	.095	.102
tks, wks ....lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ....lb.	.085	.092	.085	.092	.085	.092
tks, wks ....lb.	...	.075	...	.075	...	.075
Diamylnaphthalene, l-c-l, drs, f.o.b. wks, ...lb.	...	.20	...	.20	...	...
Diamylphthalate, drs, wks lb.	.21	.21½	.21	.21½	.21	.21½
Diamyl Sulfide, drs, wks lb.	...	1.10	...	1.10	...	1.10
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate, drs, wks ....lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	...	.53	...	.53	...	.53
c-l drs, wks ....lb.	...	.50	...	.50	...	.50
tks, wks ....lb.	...	.48	...	.48	...	.48
Dibutyl Ether, drs, wks, lcl lb.	...	.25	...	.25	...	.25
Dibutylphthalate, drs, wks, frt all'd ....lb.	.19	.19½	.19	.19½	.19	.19½
Dibutyltartrate, 50 gal drs lb.	...	.50	...	.50	...	.50
Dichlorethylene, drs .....lb.	...	.25	...	.25	...	.25
Dichloroethylether, 50 gal drs, wks ....lb.	.15	.16	.15	.16	.15	.16
tks, wks ....lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	...	.04	.025	.04	...	.025
tks, wks ....lb.	...	.025	.0221	.025	...	.0221
Diethanolamine, tks, wks..lb.	...	.22½	...	.22½	...	.22½
Diethylamine, 300 lb drs, lcl, f.o.b., wks ....lb.	...	.70	...	.70	...	.70
Diethylamino Ethanol, l-c-l, drs, f.o.b. Wyandotte, frt all'd E. Miss. ....lb.	...	.75	...	.75	...	...
Diethylaniline, 850 lb drs lb.	...	.40	...	.40	.40	.52
Diethylcarbonate, com drs lb.	...	.25	...	.25	...	.25
Diethylorthotoluidin, drs lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.19	.19½	.19	.19½	.19	.19½
Diethylsulfate, tech, drs, wks, lcl ....lb.	.13	.14	.13	.14	.13	.14
Diethyleneglycol, drs .....lb.	.14½	.15½	.14½	.15½	.14½	.15½
Mono ethyl ethers, drs ..lb.	.14½	.15½	.14½	.15½	.14½	.16
tks, wks ....lb.	...	.13½	...	.13½	...	.13½
Mono butyl ether, drs ..lb.	.22½	.24½	.22½	.24½	.22½	.24½
tks, wks ....lb.	...	.22	...	.22	...	.22
Diethylene oxide, 50 gal drs, wks ....lb.	.20	.24	.20	.24	.20	.24
Diglycol Laurate, bbls ....lb.	...	.16	...	.16	.16	.21
Oleate, bbls ....lb.	...	.17	...	.17	.13	.17
Stearate, bbls ....lb.	...	.22	...	.22	.22	.26
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ....lb.	1.00	1.05	1.00	1.05	1.00	1.05
Dimethylaniline, 240 lb drs lb.	.23	.24	.23	.24	.23	.24

* These prices were on a delivered basis.

Dimethyl Phthalate
Glue, Bone

Prices

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Dimethyl phthalate, drs, wks, frt all'd ....lb.	...	.18½	...	.18½	...	.18½
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb.	...	.18	...	.18	.18	.19
Dinitrochlorobenzene, 400 lb bbls ....lb.	...	.14	...	.14	...	.14
Dinitronaphthalene, 350 lb bbls ....lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls lb.	...	.22	...	.22	.22	.23
Dinitrotoluene, 300 lb bbls lb.	...	.15½	...	.15½	...	.15½
Diphenyl, bbls ....lb.	.15	.20	.15	.20	.15	.20
Diphenylamine ....lb.	...	.25	...	.25	.25	.32
Diphenylguanidine, 100 lb drs ....lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	32.00	35.00	32.00	35.00	...	nom.
Extract ....lb.	.05¾	.06¾	.05¾	.06¾	.05¾	.06¾
Drymet (see sodium metasilicate anhydrous).						
Egg Yolk, dom., 200 lb. cases lb.	.60	.62	.60	.62	.57	.62
Epsom Salt, tech, 300 lb bbls c-l, NY .....100 lb.	...	1.90	...	1.90	1.90	2.10
USP, c-l, bbls .....100 lb.	...	2.10	...	2.10	...	2.10
Ether, USP anaesthesia 55 lb drs ....lb.	...	.26	...	.26	...	.26
Isopropyl 50 gal drs ...lb.	.07	.08	.07	.08	.07	.08
tks, frt all'd ....lb.	...	.06	...	.06	...	.06
Nitrous conc bottles ...lb.	...	.68	...	.68	...	.68
Synthetic, wks, tks .....lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks, frt all'd ....lb.	...	.06½	...	.06½	.06	.06½
drs, frt all'd ....lb.	...	.07½	...	.07½	.07	.08½
99%, tks, frt all'd ...lb.	...	.06¾	...	.06¾	.06¼	.08
drs, frt all'd ....lb.	...	.07¾	...	.07¾	.07¼	.08¾
Acetoacetate, 110 gal drs lb.	...	.27½	...	.27½	...	.27½
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech drs .....lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd ....lb.	.45	.50	.45	.50	.45	.50
Chloride, 200 lb drs ....lb.	.18	.20	.18	.20	.18	.20
Chlorocarbonate, cbys ..lb.	...	.30	...	.30	...	.30
Crotonate, drs ....lb.	...	.35	...	.35	...	.35
Formate, drs, frt all'd ..lb.	.25	.26	.25	.26	.23	.24
Lactate, drs, wks ......lb.	...	.33½	...	.33½	...	.33½
Oxalate, drs, wks ......lb.	...	.25	...	.25	...	.25
Oxybutyrate, 50 gal drs, wks ....lb.	1.00	nom.	1.00	nom.	.30	1.00
Silicate, drs, wks ......lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs ....lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont ....lb.	.75	.85	.75	.85	.75	.85
Anhydrous ....lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, E. Rockies ....lb.	.0693	.0746	.0693	.0746	.0595	.0694
Glycol, 50 gal drs, wks..lb.	.14½	.18½	.14½	.18½	.14½	.18½
tks, wks ....lb.	...	.13½	...	.13½	...	.13½
Mono Butyl Ether, drs, wks ....lb.	.16½	.17½	.16½	.17½	.16½	.21
tks, wks ....lb.	...	.15½	...	.15½	...	.15½
Mono Ethyl Ether, drs wks ....lb.	.14½	.15½	.14½	.15½	.14½	.15½
tks, wks ....lb.	...	.13½	...	.13½	...	.13½
Mono Ethyl Ether Acetate, drs, wks .....lb.	.11½	.12½	.11½	.12½	.11½	.13
tks, wks ....lb.	...	.10½	...	.10½	...	.10½
Mono Methyl Ether, drs wks ....lb.	.15½	.16½	.15½	.16½	.15½	.17
tks, wks ....lb.	...	.14½	...	.14½	...	.14½
Oxide, cyl ....lb.	.50	.55	.50	.55	.50	.55
Ethylideneaniline ......lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery ....ton	17.00	19.00	17.00	19.00	17.00	19.00
Powd, blk wks ....ton	14.00	17.50	14.00	17.50	14.00	17.50
Ferric Chloride, tech, crys, 475 lb bbls ....lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys ....lb.	.06½	.07	.06½	.07	.06¼	.07
Fish Scrap, dried, unground wks ....unit *l*	no prices		no prices		3.10	4.25
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis ....unit *m*	no prices		no prices		2.25	3.50
Fluorspar, 98% bgs ....ton	...	29.00	...	29.00	29.00	32.00
Formaldehyde, USP, 400 lb bbls, wks ....lb.	.055	.06	.055	.06	.05¾	.06¼
Fossil Flour ....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines ton	...	15.00	...	15.00	...	15.00
Imp powd, c-l, bgs ....ton	no prices		no prices		...	25.00
Furfural (tech) drs, wks lb.	.10	.15	.10	.15	.10	.15
tks, wks ....lb.	...	.09	...	.09	...	...
Furfuramide (tech) 100 lb drs ....lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16	.17¼	.16	.17¼	.16	.17¼
Fustic, crystals, 100 lb boxes ....lb.	.24	.25	.24	.25	.24	.28
Liquid 50°, 600 lb bbls lb.	.10½	.14	.10½	.14	.10½	.14
Solid, 50 lb boxes ..lb.	.19	.21	.19	.21	.19	.21
G Salt paste, 360 lb bbls..lb.	...	.45	...	.45	.45	.47
Gambier, com 200 lb bgs..lb.	.07	.08	.06½	.08	.06½	.07
Singapore cubes, 150 lb bgs ....100 lb.	.09	.10	.08¼	.10	.08¼	.10
Glauber's Salt, tech, c-l, bgs, wks* ....100 lb.	.95	1.18	.95	1.18	.95	1.18
Anhydrous, see Sodium Sulfate						
Glue, bone, com grades, c-l bgs ....lb.	.13½	.15	.13½	.15	.13½	.15½
Better grades, c-l, bgs lb.	.15	.23	.15	.23	.15	.23

l + 10; *m* + 50; * Bbls. are 20c higher.

Current

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Glycerin, CP, 550 lb drs lb.	...	.12½	...	.12½	...	.12½
Dynamite, 100 lb drs ... lb.	...	nom.	...	nom.	...	nom.
Saponification, drs ..... lb.	.09½	.10½	.09½	.10½	.09½	.13
Soap Lye, drs .... lb.	.07½	.07¾	.07⅝	.07¾	.07⅝	.08¼
Glyceryl Bori-Borate, bbls lb.	...	.40	...	.40	...	.40
Monoricinoleate, bbls ... lb.	...	.27	...	.27	...	.27
Monostearate, bbls ..... lb.	...	.30	...	.30	...	.30
Oleate, bbls .... lb.	...	.22	...	.22	...	.22
Phthalate .... lb.	...	.38	...	.38	.37	.38
Glyceryl Stearate, bbls ... lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls .. lb.	...	.22	...	.22	...	.22
Phthalate, drs .... lb.	...	.38	...	.38	...	.38
Stearate, drs .... lb.	...	.26	...	.26	...	.26
GUMS						
Gum Aloes, Barbadoes ... lb.	.80	.85	.80	.85	.80	.90
Arabic, amber sorts .... lb.	.14	.15	.14	.15	.08½	.15
White sorts, No. 1, bgs lb.	.35	.36	.35	.36	.28	.36
No. 2, bgs .... lb.	no prices		no prices		.27	.34
Powd, bbls .... lb.	.18	.20	.18	.20	.12½	.20
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b. NY .... lb.	.04½	.05½	04½	.05½	.02½	.10½
California, f.o.b. NY, drs ton	29.00	36.50	29.00	36.50	29.00	36.50
Egyptian, 200 lb cases, f.o.b. NY .... lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases .... lb.	.19	.20	.19	.20	.17	.24
Copal, Congo, 112 lb bgs, clean, opaque .... lb.	...	.49½	...	.49½	...	.49½
Dark amber .... lb.	...	.12⅜	...	.12⅜	.11⅜	.12⅜
Light amber .... lb.	...	.17	...	.17	...	.17
Copal, East India, 180 lb bgs						
Macassar pale bold .... lb.	...	.12¾	...	.12¾	.12¾	.15⅝
Chips .... lb.	...	.06¾	...	.06¾	.06¾	.09
Dust .... lb.	...	.05¼	...	.05¼	.04¾	.06¾
Nubs .... lb.	...	.10½	...	.10½	.10½	.14⅜
Singapore, Bold .... lb.	...	.15¾	...	.15¾	.14⅝	.17½
Chips .... lb.	...	.08½	...	.08½	.08½	.09⅛
Dust .... lb.	...	.05¼	...	.05¼	.04¾	.06¾
Nubs .... lb.	...	.11	...	.11	.11	.13½
Copal Manila, 180-190 lb	...	.13⅞	...	.13⅞	.13¾	.16¾
Loba B .... lb.	...	.11¾	...	.11¾	.11¾	.16⅛
Loba C .... lb.	...	.11¼	...	.11¼	.11¼	.14½
DBB .... lb.	...	.10	...	.10	.06⅞	.12⅛
MA sorts .... lb.	...	.07¾	...	.07¾	.07¾	.13¾
Copal Pontianak, 224 lb cases, bold genuine .. lb.	...	.15⅜	...	.15⅜	.15⅛	.18½
Chips .... lb.	...	.10	...	.10	.08⅜	.10½
Mixed .... lb.	...	.14⅜	...	.14⅜	.14⅛	.16⅝
Nubs .... lb.	...	.12¾	...	.12¾	..10¾	.13½
Split .... lb.	...	.13¾	...	.13¾	.13½	.16⅛
Damar Batavia, 136 lb cases						
A .... lb.	...	.21⅝	...	.21⅝	.21⅝	.22¾
B .... lb.	...	.20¼	...	.20¼	.20⅛	.21⅛
C .... lb.	...	.14⅝	...	.14⅝	.15⅝	.15¼
D .... lb.	...	.13¼	...	.13¼	.13¼	.13¾
A/D .... lb.	...	.15¼	...	.15¼	.13⅞	.14½
A/E .... lb.	...	.12⅞	...	.12⅞	.12⅞	.13⅜
E .... lb.	...	.10	...	.10	.10	.10⅜
F .... lb.	...	.08	...	.08	.08	.08¾
Singapore, No. 1 ...... lb.	...	.16⅝	...	.16⅝	.16⅝	.19⅝
No. 2 .... lb.	...	.12¼	...	.12¼	.12¼	.15¾
No. 3 .... lb.	...	.07⅛	...	.07⅛	.07⅛	.09
Chips .... lb.	...	.11	...	.11	.11	.12½
Dust .... lb.	...	.07⅛	...	.07⅛	.07⅛	.09
Seeds .... lb.	...	.09⅞	...	.09⅞	.09⅞	.10½
Elemi, cns, c-l .... lb.	...	.08½	...	.08½	.10⅛	.11⅝
Ester .... lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
Gamboge, pipe, cases ..... lb.	.75	.80	.75	.80	.70	.75
Powd, bbls .... lb.	.80	.85	.80	.85	.75	.80
Ghatti, sol, bgs .... lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls, bxs, drs ... lb.	.14	.33	.14	.33	.14	.33
Kauri, NY						
Brown XXX, cases .... lb.	...	.60	...	.60	...	.60
BX .... lb.	...	.38	...	.38	...	.38
B1 .... lb.	...	.28	...	.28	...	.28
B2 .... lb.	...	.24	...	.24	...	.24
B3 .... lb.	...	.18½	...	.18½	...	.18½
Pale XXX .... lb.	...	.61	...	.61	...	.61
No. 1 .... lb.	...	.41	...	.41	...	.41
No. 2 .... lb.	...	.24	...	.24	...	.24
No. 3 .... lb.	...	.17¾	...	.17¾	...	.17¾
Kino, tins .... lb.	no prices		no prices		2.00	4.50
Mastic .... lb.	1.50	1.60	1.50	1.60	.85	2.50
Sandarac, prime quality, 200 lb bgs & 300 lb cks .. lb.	.50	.55	.50	.55	.35	.37
Senegal, picked bags ..... lb.	...	.30	...	.30	...	.30
Sorts .... lb.	...	.13	...	.13	...	.13
Thus, bbls .... 280 lbs.	15.00	15.25	15.00	15.25	15.00	15.25
Tragacanth, No. 1, cases .. lb.	2.75	2.85	2.75	3.10	2.65	3.50
No. 2 .... lb.	2.45	2.60	2.45	2.60	2.55	3.35
No. 3 .... lb.	2.10	2.20	2.10	2.20	2.45	2.90
Yacca, bgs .... lb.	.03½	.04	.03½	.04	.03½	.04
Hematine crystals, 400 lb bbls lb.	.20	.30	.20	.30	.20	.30
Hemlock, 25%, 600 lb bbls.						
wks .... lb.	...	.03⅛	...	.03⅛	.03⅛	.03⅜
tks .... lb.	...	.02¾	...	.02¾	.02¾	.03
Hexalene, 50 gal drs. wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks .... gal.	...	.09¾	...	.09¾	...	.10½
Hexamethylenetetramine, powd, drs .... lb.	.32	.33	.32	.33	.32	.33
Hexyl Acetate, secondary, delv, drs .... lb.	.13	.13½	.13	.13½	.13	.13½
tks .... lb.	...	.12	...	.12	...	.12
Hoof Meal, f.o.b. Chicago unit	2.75	2.80	2.70	2.80	2.00	3.15
Hydrogen Peroxide, 100 vol, 140 lb cbys .... lb.	.16	.18½	.16	.18½	.16½	.20

	Current Market		1941		1940	
			Low	High	Low	High
Hydroxylamine Hydrochloride ....lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	...	.14	...	.14		.14
Indigo, Bengal, bbls .....lb.	1.63	1.67	1.63	1.67	1.63	1.67
Synthetic, liquid ....lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, jars..lb.	...	1.75	...	1.75	1.75	2.50
Irish Moss, ord, bales ....lb.	.25	.28	.25	.28	.15	.28
Bleached, prime, bales...lb.	.32	.35	.32	.35	.28	.35
Iron Acetate Liq. 17°, bbls delv ....lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls..100 lb.	3.50	4.00	3.50	4.00	2.75	4.00
Isobutyl Carbinol (128-132° C)						
drs, frt all'd ....lb.	...	.23½	.22½	.23½	.22½	.34
tks, frt all'd ....lb.	...	.21½	...	.21½	.21½	.32
Isopropyl Acetate, tks, frt all'd ....lb.	...	.06½	...	.06½	.05½	.06½
drs, frt all'd ....lb.	.07½	.08	.07½	.08	.06½	.07½
Ether, see Ether, isopropyl.						
Keiselguhr, dom bags, c-l, Pacific Coast ....ton	22.00	25.00	22.00	25.00	22.00	35.00
Lead Acetate, f.o.b. NY, bbls,						
White, broken ....lb.	...	.11	...	.11	...	.11
cryst, bbls ....lb.	...	.11	...	.11	...	.11
gran bbls ....lb.	...	.11¾	...	.11¾	...	.11¾
powd, bbls ....lb.	...	.11¾	...	.11¾	...	.11¾
Arsenate, East, drs .....lb.	.09	.09½	.09	.09½	.08½	.11
Linoleate, solid, .bbls...lb.	...	.19	...	.19	...	.19
Metal, c-l, NY .....100 lb.	...	5.55	...	5.55	4.90	5.70
Nitrate, 500 lb bbls, wks lb.	.11	.14	.11	.14	.11	.14
Oleate, bbls ....lb.	.18½	.20	.18½	.20	.18½	.20
Red, dry, 95% Pb_3O_4, delv ....lb.	...	.08½	.08	.08½	.07½	.0815
97% Pb_3O_4, delv ....lb.	...	.084	.084	.0850	.0765	.0848
98% Pb_3O_4, delv ....lb.	...	.0865	.0865	.0875	.08	.0865
Resinate, precip, bbls...lb.	...	.16½	...	.16½	...	.16½
Stearate, bbls ....lb.	...	.25	...	.25	...	.26
Titanate, bbls, c-l, f.o.b. wks, frt all'd ....lb.	...	.10¼	...	.10¼	.10	.10¼
White, 500 lb bbls, wks, lb.	...	.07½	...	.07½	.07	.07½
Basic sulfate, 500 lb bbls, wks ....lb.	...	.06½	...	.06½	.06¼	.06½
Lime, chemical quicklime, f.o.b. wks, bulk .....ton	7.00	13.00	7.00	13.00	7.00	13.00
Hydrated, f.o.b. wks ...ton	8.50	16.00	8.50	16.00	8.50	16.00
Lime Salts, see Calcium Salts						
Lime, sulfur, dealers, tks gal.	...	.07½	...	.07½	.07½	.11½
drs ....gal.	.10	.14	.10	.14	.11	.16
Linseed Meal, bgs ....ton	23.00	23.50	23.00	25.00	23.50	37.00
Litharge, coml, delv, bbls lb.	...	.0715	.07	.0715	.06½	.07½
Lithopone, dom, ordinary,						
delv, bgs ....lb.	...	.0385	...	.0385	...	.036
bbls ....lb.	...	.0410	...	.0410	.03¾	.03¾
Titanated, bgs ....lb.	...	.05¼	...	.05¼	...	.05¼
bbls ....lb.	...	.05½	...	.05½	...	.05½
Logwood, 51°, 600 lb bbls lb.	.10½	.12½	.10½	.12½	.10½	.12½
Solid, 50 lb boxes .....lb.	.16½	.20½	.16½	.20½	.16½	.20½
Madder, Dutch ....lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbls ton	65.00	70.00	65.00	70.00	58.00	70.00
Magnesium Carb, tech, 70 lb bgs, wks ....lb.	...	.06¼	...	.06¼	...	.06¼
Chloride flake, 375 lb bbls, c-l, wks ....ton	...	32.00	...	32.00	32.00	42.00
Fluosilicate, crys, 400 lb bbls, wks ....lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, calc tech, heavy bbls, frt all'd ......lb.	...	.26	...	.26	.25	.30
Light bbls above basis lb.	...	.26	...	.26	.20	.26
USP Heavy, bbls, above basis ....lb.	...	.26	...	.26	.25	.30
Palmitate, bbls ....lb.	.33	nom.	.33	nom.	.33	nom.
Silicofluoride, bbls .....lb.	.11	.11½	.11	.11½	.11	.11½
Stearate, bbls ....lb.	.23	.26	.23	.26	.23	.27
Manganese, acetate, drs ..lb.	...	.26½	...	.26½	...	.26½
Borate, 30%, 200 lb bbls lb.	.15	16	.15	.16	.15	.16
Chlorate, 600 lb cks ....lb.	...	.08½	...	.08½	...	.08½
Dioxide, tech (peroxide), paper bgs, c-l ....ton	...	70.00	...	70.00	62.50	70.00
Hydrate, bbls ....lb.	...	.82	...	.82	...	.82
Linoleate, liq, drs .....lb.	.18	.19½	.18	.19½	.18	.19½
solid, precip, bbls ....lb.	...	19	...	.19	...	.19
Resinate, fused, bbls ...lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, drs ....lb.	...	.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-95%, 550 lb drs .....lb.	.10½	.10¾	.10½	.10¾	.08	.09¾
Mangrove, 55%, 400 lb bbls lb.						
Bark, African ....ton	34.50	nom.	34.00	35.00	30.00	39.50
Mannitol, pure cryst, cs, wks lb.	...	.85	.85	.90	.90	1.00
commercial grd, 250 lb bbls ....lb.	.35	.40	.35	.45	.38	.50
Marble Flour, blk ....ton	12.00	14.00	12.00	14.00	12.00	14.00
Mercury chloride (Calomel) lb.	...	2.70	...	2.70	2.45	2.95
Mercury metal ..76 lb. flasks	174.00	176.00	167.00	176.00	163.00	228.50
Mesityl Oxide, f.o.b. dest.,						
tks ....lb.	...	.15	...	.15	...	.15
drs, c-l ....lb.	...	.16	...	.16	...	.16
drs, lcl ....lb.	...	.16½	...	.16½	...	.16½
Meta-nitro-aniline ....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ....lb.	1.05	1.10	1.05	1.10	1.05	1.40
Meta-phenylene diamine 300 lb bbls ....lb.	...	.65	...	.65	...	.65
Meta-toluene-diamine 300 lb bbls ....lb.	...	.65	...	.65	.65	.67
Methanol, denat, grd, drs,						
c-l frt all'd ....gal.	...	.45	...	.45	...	.45
tks, frt all'd ....gal.	...	.40	...	.40	...	.40

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Methanol (continued):						
Pure, drs, c-l, frt all'd gal.	...	.35½	...	.35½	.35	.38
tks ....gal.	...	.30	...	.30	.30	.33
95%, tks ....gal.	...	.29	...	.29	.28	.31
97%, tks ....gal.	...	.30	...	.30	.29	.32
Methyl Acetate, tech tks, delv ....lb.	.06	.07	.06	.07	.06	.07
55 gal drs, delv ......lb.	.07	.08	.07	.08	.07	.08
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½	.10½	.09½	.10½
55 gal drs, delv .....lb.	.10½	.11½	.10½	.11½	.10½	.11½
Acetone, frt all'd, drs gal. *p*	...	.37½	...	.37½	.41	.44
tks, frt all'd ......gal. *p*	...	.32	...	.32	.35	.39
Synthetic, frt all'd, east of Rocky M., drs ....gal. *p*	...	.37½	...	.37½	.36	.44
tks, frt all'd ...gal.	...	.32	...	.32	.32	.36
West of Rocky M., frt all'd, drs...gal *p*	...	.41½	...	.41½	.41½	.48
tks, frt all'd ..gal. *p*	...	.35	...	.35	.35	.45½
Anthraquinone ....lb.	...	.83	...	.83	...	.83
Butyl Ketone, tks ......lb.	...	.10½	...	.10½	...	.10½
Cellulose, 100 lb lots, frt all'd ....lb.	...	.55	...	.55	.55	.70
less than 100 lbs. f.o.b. wks ....lb.	...	.60	...	.60	.60	.75
Chloride, 90 lb. cyl ....lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone, tks, frt all'd lb.	...	.06	...	.06	.05½	.06
50 gal drs, frt all'd, c-l lb.	.07	.07½	.07	.07½	.06½	.07½
Formate, drs, frt all'd ..lb.	...	.89	...	.89	...	.89
Hexyl, Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd ..lb.	...	.80	...	.80	...	.80
Mica, dry grd, bgs, wks..ton	...	30.00	...	30.00	...	30.00
Michler's Ketone, kgs ....lb.	...	2.50	...	2.50	...	2.50
Mixed Amylnaphthalenes mixed, ref., l-c-l, drs, f.o.b. wks ....lb.	...	1.75	...	1.75	...	...
crude ....lb.	...	.15	...	.15	...	...
Monoamylamine,c-l,drs,wks lb.	...	.52	...	.52	...	.52
lcl, drs, wks ....lb.	...	.55	...	.55	...	.55
Monoamylnaphthalene, l-c-l, drs, f.o.b. wks ....lb.	...	.20	...	.20	...	...
Monobutylamine, drs, c-l, wks ....lb.	...	.50	...	.50	...	.50
lcl, wks ....lb.	...	.53	...	.53	...	.53
tks, wks ....lb.	...	.48	...	.48	...	.48
Monochlorobenzene, see "C"						
Monoethanolamine, tks, wks, lb.	...	.23	...	.23	...	.23
Monoethylamine (100% basis) lcl, drs, f.o.b. wks .....lb.	...	.65	...	.65	...	.65
Monomethylamine, drs, frt all'd, E. Mississippi, c-l lb.	...	.65	...	.65	...	.65
Monomethylparamiosulfate, 100 lb drs ....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Morpholine, drs 55 gal, wks ....lb.	...	.67	...	.67	...	.75
Myrobalans 25%, liq bbls lb.	no prices		no prices		no prices	
50% Solid, 50 lb boxes lb.	no prices		no prices		no prices	
J1 bgs ....ton	...	45.00	35.00	45.00	28.50	40.00
J2 bgs ....ton	...	36.00	28.00	36.00	23.00	34.00
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks ....gal.	...	26	...	.26	.26	.27
drs, c-l ....gal.	...	.31	...	.31	.31	.32
Naphthalene, dom, crude bgs, wks .... lb. *q*	2.25	2.50	2.25	2.50	2.25	2.75
imported, cif, bgs ....lb.	no prices		no prices		...	3.00
Balls, flakes, pks ......lb.	.06¼	.07¾	.06¼	.07¾	.06¼	.07¾
Balls, ref'd bbls, wks...lb.	...	.07	...	.07	.06¾	.07
Flakes, re'd, bbls, wks lb.	...	.07	...	.07	.06¾	.07
Nickel Carbonate, bbls ...lb.	.36	.36½	.36	.36½	.36	.36½
Chloride, bbls ....lb.	.18	.20	.18	.20	.18	.20
Metal ingot ....lb.	.34	.36	.34	.36	.34	.35
Oxide, 100 lb kgs, NY lb.	.35	.38	.35	.38	.35	.38
Salt, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, sulfate, 40%, drs, 55 lb drs ....lb.	...	.70	...	.70	...	.70
Nitre Cake, blk ....ton	...	16.00	...	16.00	...	16.00
Nitrobenzene redistilled, 1000 lb drs, wks ....lb.	.08	.09	.08	.09	.08	.10
tks ....lb.	...	.07	...	.07	...	.07
Nitrocellulose, c-l, lcl, wks lb.	.20	.29	.20	.29	.20	.29
Nitrogen Sol. 45½% ammon, f.o.b. Atlantic & Gulf ports, tks, unit ton, N basis	...	1.2158	...	1.2158	...	1.2158
Nitrogenous Mat'l, bgs imp unit	no prices		no prices		2.20	2.60
dom, Eastern wks ....unit	...	2.20	...	2.20	2.20	2.90
dom, Western wks ....unit	...	2.00	1.75	2.00	1.95	2.00
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs ....lb.	.27	.29	.27	.29	.28	.30
Oak Bark Extract, 25%, bbls lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜
tks ....lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks ..lb.	...	.15	...	.15	...	.15
Orange-Mineral, 1100 lb cks NY ....lb.	...	.11	...	.11	.10½	.13½
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.15	2.25
Ortho amyl phenol, l-c-l, drs, f.o.b. wks ....lb.	...	.15	...	.15	...	...
Orthoanisidine, 100 lb drs lb.	...	.70	...	.70	.70	.74
Orthochlorophenol, drs ...lb.	...	.32	...	.32	...	.32
Orthocresol, 30.4°, drs, wks lb.	.16	.16½	.16	.16½	.16	.16½
Orthodichlorobenzene, 1000 lb drs ....lb.	.06	.07	.06	.07	.06	.07
Orthonitrochlorobenzene, 1200 lb drs, wks ....lb.	.15	.18	.15	.18	.15	.18

a Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila., or N. Y.

		Current Market		1941 Low	1941 High	1940 Low	1940 High
Orthonitroparachlorphenol, tins	lb.	...	.75	...	.75	...	.75
Orthonitrophenol, 350 lb drs	lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, 1000 lb drs, wks	lb.	...	.09	...	.09	...	.09
Orthotoluidine, 350 lb bbls, lcl	lb.	...	.19	...	.19	...	.19
Osage Orange, cryst, bbls	lb.	...	.21	...	.21	...	.21
51° liquid	lb.	...	.10	...	.10	...	.10
Paraffin, rfd, 200 lb bgs							
122-127° M P	lb.	...	.057	...	.057	.02¼	.0675
128-132° M P	lb.	.057	.0595	.057	.0595	.057	.0705
133-137° M P	lb.	.06¼	.06½	.06¼	.06½	.06¼	.0755
Para aldehyde, 99%, tech, 110-55 gal drs, wks	lb.	.10	.11¼	.10	.11¼	.10	.11¼
Aminoacetanilid, 100 lb kgs	lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs	lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs	lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs	lb.	...	.32	...	.32	...	.32
Dichlorobenzene 200 lb drs, wks	lb.	.11	.12	.11	.12	.11	.12
Formaldehyde, drs, wks	lb.	.23	.24	.23	.24	.34	.35
Nitroacetanilid, 300 lb bbls	lb	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks	lb.	...	45	...	.45	.45	.47
Nitrochlorobenzene, 1200 lb drs, wks	lb.	...	.15	...	.15	.15	.16
Nitro-orthotoluidine, 300 lb bbls	lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls	lb.	...	.35	...	.35	.35	.37
Nitrosodimethylaniline, 120 lb bbls	lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls	lb.	...	.30	...	.30	...	.30
Phenylenediamine, 350 lb bbls	lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls	lb.	...	.70	...	.70	.70	.75
tks, wks	lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks	lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks	lb.	...	.48	...	.48	.48	.50
Paris Green, dealers, drs	lb.	.23	.25	.23	.25	.23	.26
Pentane, normal, 28-38° C, group, 3 tks	gal.	...	.08½	...	.08½	...	.08½
drs, group 3	gal.	.11½	.16	.11½	.16	.11½	.16
Perchlorethylene, 10 lb drs, frt all'd	lb.	.08	.08½	.08	.08½	.08	.08¾
Petrolatum, dark amber, bbls	lb.	...	.02¾	...	.02¾	.02¾	.05
White, lily, bbls	lb.	...	.04¾	...	.04¾	.04¾	.08½
White, snow, bbls	lb.	...	05½	...	.05½	.05½	.09½
Petroleum Ether, 30-60°, group 3, tks	gal.	...	.13½	...	.13½	...	.13½
drs, group 3	gal.	...	.14½	...	.14½	.14½	.25½

PETROLEUM SOLVENTS AND DILUENTS

		Current Market		1941 Low	1941 High	1940 Low	1940 High
Cleaners naphthas, group 3, tks ,wks	gal.	.06⅞	.07	.06⅞	.07	.06⅞	.07
East Coast, tks, wks	gal.	.09	.10½	.09	.10½	.09	.10½
Lacquer diluents, tks							
East Coast	gal.	.09½	.10	.09½	.10	.09½	.10
Group 3, tks	gal.	.06¼	.07⅜	...	.07⅜	.07⅜	.07⅞
Naphtha, V.M.P., East tks, wks	gal.	.09	.09½	.09	.09½	.09½	.10
Group 3, tks, wks	gal.	.06⅞	.07	.06⅞	.07	.06⅜	.07⅞
Petroleum thinner, 43-47,							
East, tks, wks	gal.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Group 3, tks, wks	gal.	.06	.07	.05⅞	.07	.05⅞	.07
Rubber Solvents, stand grd, East, tks, wks	gal.	...	.09½	...	.09½	.09½	.10
Group 3, tks, wks	gal.	.06	.07	.06	.07	.06⅜	.07⅞
Stoddard Solvents, East, tks, wks	gal.	.083	.09½	.083	.09½	.08¾	.09½
Group 3, wks	gal.	.05½	.06½	.05½	.06½	.06⅜	.06½
Phenol, 250-100 lb drs	lb.	.12	.13¾	.12	.13¾	.12	.14¾
tks, wks	lb.	...	.11	...	.11	.11	.12
Phenyl-Alpha-Naphthylamine, 100 lb kgs	lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs	lb.	...	.17	...	.17	...	.17
Phenylhydrazine Hydrochloride, com	lb.	...	1.50	...	1.50	...	1.50
Phloroglucinol, tech, tins	lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tons	lb.	20.00	22.00	20.00	22.00	20.00	22.00
Phosphate Rock, f.o.b. mines							
70% basis	ton	...	2.15	...	2.15	1.85	1.90
72% basis	ton	...	2.40	...	2.40	2.15	2.35
Florida Pebble, 68% basis	ton	...	1.90	...	1.90	1.90	2.85
75-74% basis	ton	...	2.90	...	2.90	2.90	3.85
Tennessee, 72% basis	ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175 lb cyl	lb.	.15	.18	.15	.18	.15	.20
Red, 110 lb cases	lb.	.40	.44	.40	.44	.40	.44
Sesquisulfide, 100 lb cs	lb.	.38	.42	.38	.42	.38	.44
Trichloride, cyl	lb.	.15	.16	.15	.16	.15	.18
Yellow, 110 lb cs, wks	lb.	.18	.20	.18	.20	.18	.20
Phthalic Anhydride, ,100 lb drs, wks	lb.	.14½	.15½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls							
Destructive dist	lb.	.50	.55	.50	.55	.53	.56
Steam dist wat wh bbls	gal.	...	.59	...	.59	...	.59
tks	gal.	...	.54	...	.54	...	.54
Pitch Hardwood, wks	ton	23.75	24.00	23.75	24.00	23.75	24.00
Coaltar, bbls, wks	ton	19.00	22.00	19.00	22.00	...	19.00

Current

Pitch, Burgundy
Rosins

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Pitch (continued)						
Burgundy, dom, bbls, wks lb.	.06	.06½	.06	.06½	.05½	06½
Imported ....lb.	no prices		no prices		no prices	
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ....bbl.	6.00	6.50	6.00	6.50	6.00	6.50
Polyamylnaphthalene, l-c-l, drs, f.o.b. wks ....lb.	...	.30	...	.30	...	...
Potash, Caustic, wks, sol ..lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake ....lb.	...	.07	...	.07	.07	.07½
liquid, tks ....lb.	...	.02⅞	...	.02⅞	.02⅞	.03¾
Manure Salts, Dom 30% basis, blk .....unit	...	.60	...	.60	.53½	.58½
Potassium Abietate, bbls ..lb.	...	.08	...	.08	.08	.09
Acetate, tech, bbls, delv lb.	...	.26	...	.26	...	.26
Bicarbonate, USP, 320 lb bbls ....lb.	...	.17	...	.17	...	.18
Bichromate Crystals, 725 lb cks* ....lb.	.08⅞	.09¼	.08⅞	.09¼	.08¾	.09¼
Binoxalate, 30 lb bbls ..lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs ...lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks ....lb.	.06½	.06¾	.06½	.06¾	.06½	.07
liquid, tks ....lb.	...	.0275	...	.0275	.0275	.03
drs, wks ....lb.	.03	.03⅛	.03	.03⅛	.03	.03½
Chlorate crys, 112 lb kgs, wks ....lb.	...	.11	...	.11	.10½	.13
gran, kgs ....lb.	.12	.14½	.12	.14½	.12	.14½
powd, kgs ....lb.	...	.10	...	.10	.10	.12½
Chloride, crys, bbls ....lb.	.04	nom.	.04	nom.	.04	.04¾
Chromate, kgs ....lb.	.24	.27	.24	.27	.24	.27
Cyanide, drs ....lb.	...	.55	...	.55	.55	.75
Iodide, 250 lb bbls .....lb.	...	1.20	...	1.20	...	1.35
Metabisulfite, 300 lb bbls lb.	nom.	.19	nom.	.19	.13	.19
Muriate, bgs, dom, blk unit	...	.53½	...	.53½	...	.53½
Oxalate, bbls ....lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks ..lb.	.09½	.11	.09½	.11	.09½	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.20	.20½	.20	.20½	.18½	.20½
Prussiate, red, bbls ....lb.	no prices		no prices		.38	.45
Yellow, bbls ....lb.	.16	.18	.16	.18	.15	.18
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	34.25	36.25
Titanium Oxalate, 200 lb bbls ....lb.	...	.40	...	.40	.40	.45
Pot & Mag Sulfate, 48% basis bgs ....ton	...	27.00	...	27.00	24.75	27.00
Propane, group 3, tks ....lb.	.03¾	.04	.03¾	.04	.03	.04⅜
Putty, com'l, tubs ....100 lb.	...	3.15	...	3.15	...	6.00
Linseed Oil, kgs ....100 lb.	...	5.00	...	5.00	...	4.50
Pyrethrum, conc liq:						
2.4% pyrethrins, drs, frt all'd ....gal.	4.75	4.95	4.75	4.95	4.75	7.50
3.6% pyrethrins, drs, frt all'd ....gal.	...	7.20	...	7.20	7.20	11.00
Flowers, coarse, Japan, bgs ....lb.	.23	.25	.23	.25	.23	.36
Fine powd, bbls ......lb.	.25	.26	.25	.26	.25	.37
Pyridine, denat, 50 gal drs gal.	...	1.71	...	1.71	...	1.71
Refined, drs ....lb.	...	.48	...	.48	...	.51
Pyrites, Spanish cif Atlantic ports, blk ....unit	no prices		no prices		.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.40	2.15	2.40	2.15	2.40
Quebracho, 35% liq tks ..lb.	...	.03¾	...	.03¾	.03¼	.03¾
450 lb bbls, c-l ......lb.	...	.04¼	...	.04¼	.04	.04¼
Solid, 63%, 100 lb bales cif ....lb.	...	.04⅞	...	.04⅞	.04½	.04⅞
Clarified, 64% bales ..lb.	...	.05⅛	...	.05⅛	.04¾	.05⅛
Quercitron, 51 deg liq, 450 lb. bbls ....lb.	.08½	.09½	.08½	.09½	.08½	.09½
Solid, drs ....lb.	.11	.16½	.11	.16½	.10	.16½
R Salt, 250 lb bbls, wks lb.	...	.55	...	.55	...	.55
Resorcinol, tech, cans ....lb.	.68	.74	.68	.74	.75	.80
Rochelle Salt, cryst ......lb.	.36½	.37	.32½	.37	.22¼	.29¾
Powd, bbls ....lb.	.35½	.36	.31½	.36	.21¾	.28¾
Rosin Oil, bbls, first run gal.	...	.40	.40	.50	...	.50
Second run ....gal.	...	.42	.42	.56	.52	.56
Third run, drs ....gal.	...	.46	.46	.57	.56	.57
Rosins 600 lb bbls, 100 lb unit ex. yard NY:**						
B	...	2.11	2.06	2.11	1.80	2.45
D	...	2.20	2.08	2.20	1.87	2.48
E	...	2.22	2.07	2.22	1.95	2.51
F	...	2.22	2.08	2.22	2.10	2.51
G	...	2.22	2.18	2.22	2.10	2.48
H	...	2.23	2.27	2.26	2.10	2.48
I	...	2.26	2.26	2.39	2.10	2.54
K	...	2.45	2.45	2.65	2.12	2.75
M	...	2.56	2.56	2.65	2.20	2.81
N	...	2.66	2.66	2.81	2.39	2.85
WG	...	3.11	3.10	3.11	2.68	3.17
WW	...	3.31	...	3.31	3.00	3.40
X	...	3.31	...	3.31	...	...
Rosins, Gum, Savannah (280 lb. unit):**						
B	...	1.56	1.31	1.56	1.15	1.80
D	...	1.65	1.51	1.65	1.22	1.83
E	...	1.67	1.60	1.67	1.30	1.86
F	...	1.67	1.62	1.67	1.45	1.86
G	...	1.67	1.62	1.67	1.45	1.83
H	...	1.68	1.63	1.68	1.45	1.83
I	...	1.71	...	1.71	1.45	1.89
K	...	1.90	1.84	1.90	1.47	2.10
M	...	2.01	2.01	2.10	1.55	2.16

* Spot price is ⅛c higher. ** Jan. 24, 1941, high and low based on 280 lb. unit.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Rosins (continued):						
N	...	2.10	...	2.10	1.70	2.20
WG	...	2.26	...	2.26	2.03	2.52
WW	...	2.55	...	2.55	2.25	2.75
X	...	2.76	...	2.76	2.35	2.75
Rosin, Wood, c-l, FF grade, NY	1.40	1.54	1.40	1.54	1.40	1.54
Rotten Stone, bgs mines ton	25.50	37.50	25.50	37.50	25.50	37.50
Imported, lump, bbls ... lb.	no prices		no prices		...	.14
Powdered, bbls ..... lb.	no prices		no prices		.08½	.10
Sago Flour, 150 lb bgs .. lb.	.03½	.04	.03½	.04	.04	.04½
Sal Soda, bbls wks ... 100 lb.	...	1.20	...	1.20	...	1.20
Salt Cake, 94-96%, c-l, bulk wks .... ton	...	17.00	...	17.00	...	17.00
Chrome, c-l, wks .... ton						
Saltpetre, gran, 450-500 lb	...	16.00	...	16.00	11.00	16.00
bbls .... lb.	...	076	...	.076	.071	.08
Cryst, bbls .... lb.	...	.086	...	.086	.081	.08¾
Powd, bbls .... lb.	...	.086	...	.086	.081	.10
Satin, White, pulp, 550 lb bbls .... lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs ... lb.	...	46	...	.46	.46	.48
Shellac, Bone dry, bbls .. lb. r	.28	.29	.26	.29	.23	.27
Garnet, bgs .... lb.	.21	.22	.20	.22	.18½	.23
Superfine, bgs .... lb. s	.21	.22	.16½	.22	.14½	.20½
T. N., bgs .... lb. s	.20	.21	.16	.21	.13½	.19½
Silver Nitrate, vials ..... oz.	...	.26⅞	.26¾	.26⅞	.26¾	.27⅜
Slate Flour, bgs, wks .... ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks ...... 100 lb.	...	1.10	...	1.10	...	1.10
58% light, bgs ..... 100 lb.	1.05	1.08	1.05	1.08	1.05	1.08
blk .... 100 lb.	...	.90	...	.90	...	.90
paper bgs .... 100 lb.	1.05	1.08	1.05	1.08	1.05	1.08
bbls .... 100 lb.	...	1.45	...	1.45	1.35	1.45
Caustic, 76% grnd & flake, drs ...... 100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs ..... 100 lb.	...	2.30	...	2.30	...	2.30
Liquid sellers, tks .. 100 lb.	...	1.95	...	1.95	1.95	1.97½

SODIUM

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Sodium Abietate, drs ..... lb.	...	.11	...	.11	...	.11
Acetate, 60% tech, gran, powd, flake, 450 lb bbls wks .... lb.	.04	.05	.04	.05	.04	.05
90%, bbls, 275 lb delv lb.	.06	.06¾	.06	.06¾	.06	.06¾
anhyd, drs, delv ..... lb.	.08¼	.10	.08¾	.10	.08¾	.10
Alginate, drs .... lb.	.39	.70	.39	.70	.39	.96
Antimoniate, bbls ...... lb.	.14	.14½	.14	.14½	.14½	.15
Arsenate, drs .... lb.	.07	.08¾	.07	.08¾	.07	.08¾
Arsenite, liq, drs ..... gal.	...	.35	...	.35	...	.35
Dry, gray, drs, wks .. lb.	.06½	.09¼	.06½	.09¼	.06½	.09½
Benzoate, USP kgs .... lb.	.46	.50	.46	.50	.46	.52
Bicarb, powd, 400 lb bbl, wks .... 100 lb.	...	1.70	...	1.70	1.70	1.85
Bichromate, 500 lb cks, wks* .... lb.	.06⅞	.07¼	.06⅞	.07¼	.06¾	.07¼
Bisulfite, 500 lb bbls, wks lb.	.03	.031	.03	.031	.03	.031
35-40% sol bbls, wks 100 lb.	1.40	1.80	1.40	1.80	1.30	1.80
Chlorate, bgs, wks ..... lb.	...	.06¼	...	.06¼	.06¼	.08½
Cyanide, 96-98%, 100 & 250 lb drs, wks ..... lb.	.14	.15	.14	.15	.14	.15
Diacetate, 33-35% acid, bbls, lcl, delv ...... lb.	...	.09	...	.09	.08½	.09
Fluoride, white 90%, 300 lb bbls, wks ...... lb.	.07	.08	.07	.08	.07	.08
Hydrosulfite, 200 lb bbls, f.o.b. wks .... lb.	.17	.18	.17	.18	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	..	2.80	...	2.80	2.80	3.05
Tech, reg cryst, 375 lb bbls, wks .... 100 lb.	2.45		2.45		2.45	2.80
Iodide, jars .... lb.	...	2.42	...	2.42	2.30	2.42
Metanilate, 150 lb bbls .. lb.	.41	nom.	.41	nom.	.41	.42
Metasilicate, gran, c-l, wks .... 100 lb.	...	2.35	...	2.35	...	2.35
cryst, drs, c-l, wks 100 lb.	...	3.05	...	3.05	...	3.05
Anhydrous, wks, cl, drs .... 100 lb.	3.75	3.75	3.75	3.75	3.75	3.75
wks, lcl, drs, .. 100 lb.	5.05	5.05	5.05	5.05	5.05	5.05
Monohydrated, bbls .... lb.		.023		.023		.023
Naphthenate, drs ..... lb.	.12	.19	.12	.19	.12	.19
Naphthionate, 300 lb bbl lb.	...	.50	...	.50	...	.50
Nitrate, 92% crude, 200 lb. bgs, c-l, NY .... ton	...	28.70	...	28.70	...	28.30
100 bgs, same basis .. ton	...	29.40	...	29.40	...	29.00
Bulk .... ton	...	27.00	...	27.00	...	27.00
Nitrite, 500 lb bbls .... lb.	.06¾	.11½	.06¾	.11½	.06¾	.11½
Othochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Orthosilicate, 300 lb drs, c-l .... lb.	...	.03	...	.03	...	.03
Perborate, drs, 400 lb . lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.15¼
Peroxide, bbls, 400 lb . lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.40	2.30	2.40	...	2.30
bgs, wks ...... 100 lb.	...	2.20	2.10	2.20	...	2.10
Tri-sodium, tech, 325 lb bbls, wks ...... 100 lb.	...	2.55	2.45	2.55	...	2.45
bgs, wks ...... 100 lb.	...	2.35	2.25	2.35	...	2.25
Picramate, 160 lb kgs .. lb.	...	.65	...	.65	.65	.67
Prussiate, Yellow, 350 lb bbls, wks .... lb.	.10½	.10¾	.10½	.10¾	.09½	.10¾
Pyrophosphate, anhyd, 100 lb bbls f.o.b. wks frt eq lb.	...	.0515	.051	.0515	...	.0530

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Sodium (continued):						
Sesquisilicate, drs, c-l, wks .... 100 lb.	...	2.00	...	2.00	2.00	2.90
Silicate, 60°, 55 gal drs, wks .... 100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, 55 gal drs, wks 100 lb	...	.80	...	.80	...	.80
tks, wks .... 100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY .... lb.	.09¾	.11	.09¾	.11	...	...
Stannate, 100 lb drs .... lb.	.33	.36	.32½	.36	.31½	.35½
Stearate, bbls .... lb.	.19	.24	.19	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16	.18	.16	.18	.16	.18
Sulfate, Anhyd, 550 lb bgs c-l, wks .... 100 lb. t	1.45	1.65	1.45	1.65	1.45	1.90
Sulfide, 80% cryst, 440 lb. bbls, wks .... lb.	.02¼	.03	.02¼	.03	.02¼	.03
Solid, 650 lb drs, c-l, wks .... lb.	.03	.03¾	.03	.03¾	.03	.03¾
Sulfite, powd, 400 lb bbls wks .... lb.	...	.05¼	...	.05¼	.023	.05¼
Sulfocyanide, drs ...... lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls .. lb.	...	.12	...	.12	...	.12
Supersilicate (see sodium sesquisilicate)						
Tungstate, tech, crys, kgs lb.	no prices		no prices		no prices	
Sorbitol, com, solut, wks c-l, drs, wks .... lb.	...	.14¾	...	.14¾	.14¾	.16
Spruce, Extract, ord, tks .. lb.	...	.01⅛	...	.01⅛	...	.01⅛
Ordinary, bbls ..... lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, tks .. lb.	...	.01⅜	...	.01⅜	...	.01⅜
Super spruce ext, bbls .. lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs .... lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	...	2.90	2.90	2.95	2.50	2.95
Powd, 140 lb bgs ... 100 lb.	...	3.60	3.05	3.60	2.60	3.05
Potato, 200 lb bgs ..... lb.	.04½	.05½	.04½	.05½	.05	.07½
Imp, bgs .... lb.	no prices		no prices		...	.06½
Rice, 200 lb bbls .. .. lb.	.07½	.08½	.07½	.08½	.07¼	.08½
Sweet Potato, 240 lb bbls, f.o.b. plant ...... 100 lb.	nom.	7.00	nom.	7.00	5.50	7.00
Wheat, thick, bgs ..... lb.	...	.05	...	.05	.05¼	.05½
Strontium, carbonate, 600 lb bbls, wks .... lb.	no prices		no prices		.22	.23
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
Sucrose, octa-acetate, den, grd, bbls, wks ...... lb.	...	.45	...	.45	...	.45
tech, bbls, wks .... lb.	...	.40	...	.40	...	.40

SULFUR

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Sulfur, crude, f.o.b. mines ton	...	16.00	...	16.00	...	16.00
Flour, com'l, bgs ... 100 lb.	1.40	1.95	1.40	1.95	1.40	2.35
bbls .... 100 lb.	1.95	2.50	1.95	2.50	1.95	2.70
Rubbermakers, bgs .. 100 lb.	...	2.00	...	2.00	2.00	2.80
bbls .... 100 lb.	...	2.35	...	2.35	2.35	3.15
Extra fine, bgs ..... 100 lb.	...	2.35	...	2.35	2.85	3.00
Superfine, bgs ..... 100 lb.	2.65	2.80	2.65	2.80	2.65	2.80
bbls .... 100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs .... 100 lb.	2.80	3.35	2.80	3.35	2.80	3.75
bbls .... 100 lb.	3.15	3.70	3.15	3.70	3.15	4.10
Roll, bgs .... 100 lb.	2.15	2.70	2.15	2.70	2.15	3.10
bbls .... 100 lb.	2.30	2.85	2.30	2.85	2.50	3.25
Sulfur Chloride, 700 lb drs, wks .... lb.	.03	.08	.03	.08	.03	.08
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.07	.09
Multiple units, wks .... lb.	.04½	.07	.04½	.07	.04½	.07
tks, wks .... lb.	.04	.06	.04	.06	.04	.06
Refrigeration, cyl, wks lb.	.16	.40	.16	.40	.16	.40
Mutiple units, wks .... lb.	.07½	.10	.07½	.10	.07½	.10
Sulfuryl Chloride .... lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ..... ton	no prices		no prices		98.00	140.00
Extract, 42°, bbls ..... lb.	.06	.06¼	.06	.06¼	.06	.06¼
Superphosphate, 16% bulk, wks .... ton	...	8.50	...	8.50	8.50	9.00
Run of pile .... ton	...	8.00	...	8.00	8.00	8.50
Triple, 40-48%, a.p.a. bulk, wks, Balt. unit ..... ton	...	.68		.68	.68	.70
Talc, Crude, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	15.00
Ref'd 100 lb bgs, NY ton	17.25	19.25	17.25	19.25	14.00	17.25
French, 220 lb bgs, NY ton	no prices		no prices		23.00	35.00
Ref'd, white bgs, NY ton	no prices		no prices		45.00	60.00
Italian, 220 lb bgs to arr ton	no prices		no prices		64.00	70.00
Ref'd, white bgs,, NY ton	no prices		no prices		65.00	78.00
Tankage, Grd, NY ... unit u	...	2.50	2.35	2.50	2.35	3.25
Ungrd .... unit u	...	2.35	2.35	2.60	2.35	3.25
Fert grade, f.o.b. Chgo unit u	...	2.40	2.35	2.40	2.40	3.50
South American cif unit u	...	2.75	2.60	2.75	2.50	3.50
Tapioca Flour, high grade, bgs .... lb.	.03	.05	.03	.05	.02¾	.05
Tar Acid Oil, 15%, drs .. gal.	.22	.24	.22	.24	.22	.24
25% drs .... gal.	.25	.27	.25	.27	.25	.28
Tar, pine, delv, drs .... gal.	.26	.27	.26	.27	.26	.27
tks, delv, E. cities .... gal.	...	.21	...	.21		.21
Tartar Emetic, tech, bbls lb.	...	.42¾	.36¾	.42¾	.34¾	.36¾
USP, bbls .... lb.	...	.48	.42	.48	.40	.42
Terpineol, den grade, drs lb.	...	.17	...	.17	...	.17
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachlorethylene, drs, tech lb.	.08	.09	.08	.09	.08	.09½
Tetralene 50 gal drs, wks lb.	...	.18	...	.18	.12	.18
Thiocarbanilid, 170 lb bbls lb.	...	.24	...	.24	.20	.25
Tin, crystals, 500 lb. bbls, wks lb.	.38½	.39	.38	.39	.36	.40½
Metal, NY .... lb.	* ...	.51¼*	.501	.51¼	.45½	.55
Oxide, 300 lb bbls, wks lb.	no prices		.54	.56	.51	.56
Tetrachloride, 100 lb drs, wks .... lb.	.26	.26½	.25¼	.26½	.23	.26½
Titanium Dioxide, 300 lb bbls lb.	.13¾	.14	.13¾	.14	.13	.16
Barium Pigment, bbls .. lb.	.05¾	.06	.05¾	.06	.05¼	.06½
Calcium Pigment, bbls lb.	.05½	.05¾	.05½	.05¾	.05	.06¼

t Bags 15c lower; u + 10; * Feb. 28.

Prices Current

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Titanium tetrachloride, drs, f.o.b. Niagara Falls ....lb.	.32	.45	.32	.45	.32	.45
Titanium trichloride 23% sol, bbls f.o.b. Niagara Falls lb.	.22	.26	.22	.26	.22	.26
20% solution, bbls .....lb.	.175	.215	.175	.215	.175	.215
Toluidine, mixed, 900 lb drs, wks ....lb.	...	.26	...	.26	.26	.27
Toluol, 110 gal drs, wks gal.	...	.32	...	.32	.27	.32
8000 gal tks, frt all'd gal.	...	.27	...	.27	.22	.27
Toner Lithol, red, bbls ...lb.	.55	.60	.55	.60	.55	.60
Para, red, bbls ....lb.	.70	.75	.70	.75	.70	.75
Toluidine, bgs ....lb.	...	1.05	...	1.05	1.05	1.35
Triacetin, 50 gal drs, wks, lb.	...	.26	...	.26	...	.26
Triamyl Borate, lcl, drs, wks, lb.	...	.27	...	.27	...	.27
Triamylamine, drs, lcl, wks, drs ....lb.	...	.90	...	.90	.78	.90
Tributylamine, lcl, drs, f.o.b. wks ....lb.	...	.70	...	.70	.67	.70
Tributyl citrate, drs, frt all'd lb.	.24	.26	.24	.26	.24	.35
Tributyl Phosphate, frt all'd lb.	...	.42	...	.42	...	.42
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate, tech, drs lb.	.22	.36½	.22	.36½	.22	.36½
Triethanolamine, 50 gal drs, wks ....lb.	...	.19	...	.19	.19	.22
tks, wks ....lb.	...	.18	...	.18	.18	.20
Triethylamine, lcl, drs, f.o.b. wks ....lb.	...	1.05	...	1.05	...	1.05
Triethylene glycol, drs, wks lb.	...	.26	...	.26	...	.26
Trihydroxyethylamine Oleate, bbls ....lb.	...	.30	...	.30	...	.30
Stearate bbls ....lb.	...	.30	...	.30	...	.30
Trimethyl Phosphate, drs, lcl, f.o.b. dest ....lb.	...	.50	...	.50	...	.50
Trimethylamine, c-l, drs, frt all'd E. Mississippi ....lb.	...	1.00	...	1.00	...	1.00
Triphenylguanidine ....lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs ..lb.	...	.38	...	.38	...	.38
Tripoli, airfloated, bgs, wks ton	...	26.00	...	26.00	26.00	30.00
Turpentine (Spirits), c-l, NY dock, bbls ....gal.	...	.45½*	.45½	.49¼	.32½	.40
Savannah, bbls ....gal.	...	.33½*	.33½	.37¼	.26½	.34
Wood Steam dist, drs, c--lcl, NY ....gal.	.37	.40*	.35	.40	.27	.34½
Wood, dest dist, cl-lcl, drs, delv E. cities ....gal.	.35*	.36*	.35	.36	.25	.32
Urea, pure 112 lb cases ..lb.	...	.12	...	.12	.12	.15½
Fert grade, bgs, c. i. f. S.A. points ....ton	no prices		no prices		...	110.00
Dom f.o.b., wks ....ton	...	85.00	...	85.00	85.00	101.00
Urea Ammonia, liq., nitrogen basis ....ton	...	121.50	...	121.50	...	121.50
Valonia beard, 42%, tannin bgs ....ton	no prices		no prices		47.00	56.00
Cups, 32% tannin bgs ..ton	no prices		no prices		33.00	39.00
Extract, powd, 63% ...lb.	no prices		no prices		.0565	.06
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots .....lb.	...	2.60	...	2.60	...	2.60
Ex-guaiacol ....lb.	...	2.50	...	2.50	...	2.50
Ex-lignin ....lb.	...	2.50	...	2.50	...	2.50
Vermilion, English, kgs ..lb.	3.12	3.17	3.12	3.17	...	2.76
Wattle Bark, bgs ....ton	38.50	40.50	37.50	40.50	34.00	38.75
Extract, 60°, tks, bbls..lb.	.04⅛	.04¼	.03⅞	.04¼	.03⅞	.04¼
Wax, Bayberry, bgs ......lb.	.19	.20	.19	.20	.25	.30
Bees, bleached, white 500 lb slabs, cases ....lb.	.38	.40	.36½	.40	.35	.38
Yellow, African, bgs..lb.	...	.30	...	.30	.23	.29
Brazilian, bgs .....lb.	.31	.32	.31	.32	.24	.31
Refined, 500 lb slabs, cases lb.	.35	.36	.35	.36	.29	.36
Candelilla, bgs ....lb.	.19½	.20	.19	.20	.18	.19
Carnauba, No. 1, yellow, bgs ....lb.	.68	.70	.68	.71	.58	.85
No. 2, yellow, bgs ...lb.	.66	.67	.66	.69	.57	.84
No. 2, N. C., bgs ....lb.	.62	.63	.62	.68	.46	.73
No. 3, Chalky, bgs ...lb.	.55	.56½	.55	.59	.43	.66
No. 3, N. C., bgs ....lb.	.58	.59½	.58	.63	.47	.68
Ceresin, dom, bgs .....lb.	.11	.11½	.11	.11½	.11½	.15
Japan, 224 lb cases ....lb.	.16½	.17	.16½	.18½	.15½	.16½
Montan, crude, bgs ....lb.	no prices		no prices		no prices	
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.24	.25	.24	.25	.22	.25
Cakes, cases ....lb.	.25	.26	.25	.26	.23	.25
Wood Flour, c-l, bgs ....ton						
bgs, c-l, wks ....ton	24.00	25.00	24.00	25.00	20.00	30.00
Whiting, chalk, com 200 lb	18.00	19.00	18.00	19.00	11.50	19.00
Gilders, bgs, c-l, wks ..ton	16.00	20.00	16.00	20.00	12.00	20.00
Xylol, frt all'd, East 10° tks, wks ....gal.	...	.29	...	.29	...	.30
Com'l tks, wks, frt all'd gal.	...	.26	...	.26	...	.27
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.35	.36
Zein, bgs, 1000 lb lots, wks ....lb.	...	.20	...	.20	...	.20
Zinc Acetate, tech, bbls, lcl, delv ....lb.	.15	.16	.15	.16	.15	.16
Arsenite, bgs, frt all'd ..lb.	...	.12	...	.12	.12	.12½
Carbonate tech, bbls, NY lb.	.14	.16	.14	.16	.14	.16
Chloride fused, 600 lb drs, wks ....lb.	...	.04¼	...	.04¼	.04¼	.046
Gran, 500 lb drs, wks lb.	...	.05	...	.05	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.25	...	2.25	...	2.25

* Feb. 28.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Zinc (continued):						
Cyanide, 100 lb drs ....lb.	...	.33	...	.33	...	.33
Dust, 500 lb bbls, c-l, delv lb.	...	.09¼	...	.09¼	.07½	.08½
Metal, high grade slabs, c-l, NY ....1000 lb.	...	7.65	...	7.65	5.90	7.64
E. St. Louis .... 100 lb.	...	7.25	...	7.25	4.60	7.25
Oxide, Amer. bgs, wks lb.	...	.06½	...	.06½	.06¼	.07½
French 300 lb bbls, wks lb.	...	.06¾	...	.06¾	.06¼	.07¾
Palmitate, bbls ......lb.	.24½	.27½	.24½	.27½	.23	.27½
Resinate, fused, pale bbls lb.	...	.10	...	.10	...	.10
Stearate, 50 lb bbls ....lb.	...	.22	...	.22	.21½	.24½
Sulfate, crys, 40 lb. bbls wks ....lb.	...	.315	...	.315	.0275	.029
Flake, bbls ....lb.	...	.335	...	.335	...	.0325
Sulfide, 500 lb bbls, delv lb.	...	.08	...	.08	.07¾	.08
bgs, delv ....lb.	...	.07¾	...	.07¾	.07½	.07¾
Sulfocarbolate, 100 lb kgs lb.	.24	.29	.24	.29	.24	.26
Zirconium Oxide, crude, 70-75% grd, bbls, wks ton	75.00	100.00	75.00	100.00	75.00	100.00

Oils and Fats

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Babassu, tks, futures ....lb.	nom.	.06	nom.	.06	.05¾	.06⅝
Castor, No. 3, 400 lb drs lb.	.09¾	.10½	.09¾	.10½	.09¾	.12¾
Blown, 400 lb drs ..lb.	.11¾	.12½	.11¾	.12½	.11¾	.14¾
China Wood, drs, spot NY lb.	...	.27¾	.27¼	.27¾	.22½	.28
Tks, spot NY ....lb.	...	.26¾	.26¼	.26¾	.21½	.27
Coconut, edible, drs NY ..lb.	.08	.08½	.08	.08½	.07½	.09⅜
Manila, tks, NY ....lb.	...	.03½	.03⅜	.03½	.02¾	.03⅜
Tks, Pacific Coast ....lb.	...	.03¼	...	.03¼	.02¾	.03½
Cod, Newfoundland, 50 gal bbls ....gal.	.65	nom.	.60	.65	.60	.72
Copra, bgs, NY ....lb.	...	.02	.0180	.02	.0165	.0190
Corn, crude, tks, mills ...lb.	...	.06⅝	.06⅝	.06⅞	.05⅛	.06½
Refd, 375 lb bbls, NY lb.	...	.09¼	...	.09¼	.07⅞	.09
Degras, American, 50 gal bbls, NY ....lb.	.07½	.08½	.07½	.08½	.08	.10
Greases, Yellow ....lb.	nom.	.04¾	.04¾	.04⅞	.03	.05¼
White, choice, bbls, NY lb.	nom.	.05	.05	.05¼	.03⅜	.05⅝
Lard, Oil, Edible, prime ..lb.	...	.08⅞	.08½	.09¼	.08	.10
Extra, bbls ....lb.	...	.08⅝	.08¼	.08⅝	.06¾	.09⅜
Extra, No. 1, bbls .....lb.	...	.08½	.08	.08½	.06⅞	.08⅞
Linseed, Raw less than 5 drs lots ....lb.	...	.103	.091	.105	.09	.116
drs, c-l, spot ....lb.	.095	.097	.095	.099	.084	.110
Tks ....lb.	.088	.09	.084	.092	.078	.104
Menhaden, tks, Baltimore gal.	nom.	.37	.30	.37	.21	.35
Refined, alkali, drs .... lb	...	.098	.084	.098	.067	.088
Kettle boiled, drs ......lb.	...	.108	.096	.108	.079	.10
Light pressed, drs .....lb.	...	.09	.082	.09	.061	.085
Tks ....lb.	...	.08	.072	.08	.055	.072
Neatsfoot, CT, 20°, bbls, NY lb.	...	.15¼	...	.15¼	.15¼	.19¼
Extra, bbls, NY ....lb.	...	.08¾	.08¼	.08¾	.06⅞	.09
Pure, bbls, NY ....lb.	...	.10¾	...	.10¾	.08	.14¼
Oiticica, bbls ....lb.	.17	.17½	.17	.19½	.17	.21
Oleo, No. 1, bbls, NY ...lb.	...	.07¾	.07⅜	.07¾	.07⅜	.07¾
No. 2, bbls, NY ......lb	...	.07½	.07⅜	.07½	.07⅜	.07¾
Olive, denat, bbls, NY ..gal.	nom.	2.25	2.25	2.35	.94	2.40
Edible, bbls, NY .....gal.	...	3.25	...	3.25	1.85	3.25
Foots, bbls, NY ....lb.	nom.	.10¾	.10¼	.10¾	.08	.10¼
Palm, Kernel, bulk ....lb.	no prices		no prices		no prices	
Niger, cks ....lb	nom.	.04¼	.04¼	.04½	.03¼	.05½
Sumatra, tks ....lb	...	.02¼	.02	.02¼	.02⅛	.03
Peanut, crude, bbls, NY lb.	...	.09	...	.09	.06¾	.09
Tks, f.o.b. mill .....lb	nom.	.05⅜	.05¼	.05¾	.05⅛	.07⅛
Refined, bbls, NY ....lb	nom.	.08½	.08	.08½	.07⅜	.09¾
Perilla, drs, NY ....lb	.18	.18½	.18	.18½	.19	.21
Tks, Coast ....lb.	.17	.17½	.17	.17½	.18½	.20
Pine, see Pine Oil, Chem. Sec.						
Rapeseed, blown, bbls, NY lb.	nom.	.17½	nom.	.17½	.17	.17½
Denatured, drs, NY ..gal.	nom.	.95	.95	1.00	1.00	1.05
Red, Distilled, bbls .....lb.	.07¼	.08¼	.07¼	.08¼	.06¼	.09½
Tks ....lb.	...	.06¾	.06¼	.06¾	.05¾	.08
Sardine, Pac Coast, tks gal.	nom.	.50	.39	.50	.31	.39
Refined alkali, drs ...lb	...	.098	.084	.098	.067	.088
Light pressed, drs ....lb	...	.09	.078	.09	.061	.082
Tks ....lb.	...	.08	.072	.08	.055	.072
Sesame, white, dom ......lb.	...	.07½	...	.07½	.07¼	.11¾
Soy Bean, crude						
Dom, tks, f.o.b. mills ..lb.	..	.05⅝	.05½	.05⅝	.04¾	.06¼
Crude, drs, NY .....lb.	.06⅝	.07½	.06¼	.07½	.05¾	.07¾
Ref'd, drs, NY ....lb.	.07⅝	.08½	.07⅝	.08¾	.07¼	.08½
Tks ....lb.	.05⅜	.06½	.05⅜	.08	.06¼	.07⅝
Sperm, 38° CT, bleached bbls, NY ....lb.	...	.112	.11	.112	.105	.11
45° CT, blchd, bbls, NY lb.	...	.105	.103	.105	.098	.103
Stearic Acid, double pressed dist bgs ....lb.	.10	.11	.09½	.11	.09¾	.13
Double pressed saponified bgs ....lb.	.10¼	.11¼	.09¾	.11¼	.10	.13¾
Triple pressed dist bgs lb.	.13	.14	.12½	.14	.12½	.16½
Stearine, Oleo, bbls ......lb.	nom.	.06⅜	nom.	.06⅜	.05¼	.06½
Tallow City, extra loose..lb.	...	.05¼	.05	.05¼	.03⅜	.05⅜
Edible, tierces ....lb.	...	.05⅛	.04⅞	.05⅛	.04⅜	.05¾
Acidless, tks, NY .....lb.	...	.07¾	.07½	.07¾	.06¼	.08
Turkey Red, single, drs ..lb.	...	.06½	.06½	.07	.082	.09
Double, bbls ....lb.	...	.09½	.09½	.11	.11	.12¾
Whale:						
Winter bleach, bbls, NY lb.	...	.095	...	.095	...	.095
Refined, nat, bbls, NY lb.	...	.091	...	.091	...	.091

PROFESSIONAL DIRECTORY

Packaging and Container Forum
R. W. Lahey

(*Continued from page* 326)

age development activities for Standard Brands and a director of the Packaging Institute.

Presented April 2

The award plaques will be officially presented at the *Modern Packaging* banquet to be held at the Hotel Stevens, Chicago, on April 2. All of the Competition entries are now on display in Room 306, the Chanin Bldg., N. Y. City. The public is invited to inspect the display, without charge. Hours are Monday through Friday from 10:00 to 4:00, Saturday from 10:00 to 12:00.

New Products and Processes
J. M. Crowe

(*Continued from page* 320)

contraction of windings. This new 612-C is said to possess unusual retention of insulating strength at high operating temperatures such as encountered with Fiberglas and other class 'B' insulated windings.

Now Trade Marked

The name Indalone has been registered as the trade mark of the solvent $\alpha.\alpha$-Dimethyl-α'-carbobutoxy-γ-dihydro-pyrone, it has been announced by U. S. Industrial Chemicals, Inc.

Indalone, which was formerly marketed under the name "Dihydropyrone," was developed for use in liquid contact insecticides as a solvent for derris root extractives. When used in this way, it has the property of increasing the insecticidal effectiveness of the ingredients dissolved in it and of holding derris extractives in solution in the commonly used base oils.

Indalone is a powerful insectifuge and repels the common winged insects to which it appears to have an obnoxious taste. Because of this high repellency it is especially suitable for cattle sprays and mosquito lotions.

Indalone may be used in combination with another U.S.I. product, BK-5, for formulating lotions that combine sun-screening and insect repelling characteristics.

New Paints

DuPont's Finishes division has developed four new interior gloss and semi-gloss colors which are recommended for interior walls and woodwork.

New colors are "Oyster White," "Sunshine," "Capri Blue," and "Sea Green" which describe the hues exactly. They have been added to both lines of enamels.

After May 31, 1941, the company's interior gloss light blue and interior semi-gloss nile green will no longer be available.

Data on Titanium Pigments

Titanium Pigment Corp., 111 Broadway, N. Y. City, has released its new booklet containing information on the hiding power, opacity, fading and chalking tendencies of two new white titanium pigments.

New pigments, one a titanium-rutile-calcium variety identified as "Titanox"-RC and the other a titanium-rutile-calcium high-tinting variety identified as "Titanox"-RC-HT, are said to have low specific gravity, fine particle size, high-light reflectance and an increase in tinting strength.

To Mine Bauxite

Formation of a new company to be known as Bauxite Mining Corp. has been announced by Reynolds Metal, N. Y. City. New company will prospect for bauxite and engage in mining the aluminum ore.

Production will start this Spring at company's new aluminum reduction plant, Lister, Ala., it was also announced. Reynolds is currently expanding into volume production of aluminum alloys for defense industries.

Index to Advertisers

"We"—Editorially Speaking

The latest addition to the editorial staff of "C. I." is Paul B. Slawter, Jr. Our new assistant editor attended Alfred University's School of Ceramic Engineering for two years and then decided in favor of newspaper work. From '37 to '39 he published three weekly tabloids on Long Island. He then joined the staff of *Tires* as associate editor. Mr. Slawter will specialize on makeup, general news and markets.

CHEMICAL INDUSTRIES' official representative in the Army, Charles J. Cunneen, writes from Camp Dix—"Thanks for the copy of the February issue which arrived with your note. I'm still blushing from the send-off on the 'We Page.' My tentmates are doing their d....est to see that I have a hard time living it down."

The Army may be headed towards greater mechanization but the makeup of the boys behind the guns thank Heaven doesn't change.

AUTHOR J. KLEMPNER

Three novels in the past 4 years is the publisher's score for John Klempner, executive of Westvaco Chlorine Products Company. Klempner's newest novel published by Scribner's March 10 was "Another Night, Another Day," a story of modern marriage. "No Stork at Nine" and "Once Around the Block" were Mr. Klempner's first two novels.

It has been called to our attention that the telephone listing in the Geographical Section of the Guidebook for the Schwartz Laboratories, Inc. (chemical consultants and engineers) is incorrect. Instead of Murray Hill 3-0007 it should be Murray Hill 2-0007.

Before we are deluged with questions as to why A. D. McFadyen's popular series, "Personalities in Chemistry," is missing from this issue we will explain that the author despite a trip to Florida failed to duck fast enough when some of those pesky "flu" germs dashed past. We are happy to report, however, that he is again "fit as a fiddle," is back at the Patent Office where he is a chief examiner, and will have his copy in for the April issue on time—We hope! We doubt we have ever reported this before but Mr. McFadyen has probably written up more "personalities" in the United States than any other person—even professional newspaper men. It's a hobby and we'd say a mighty absorbing one.

That association executive who suggested that it would be an excellent idea for the defense authorities in Washington to have their top men get away from that city occasionally to see what is happening in other parts of the country, in our humble opinion, has something. There certainly is a lot of "defense hysteria" along the Potomac that is unnecessary and that transmitted into other sections causes senseless "jitters." While we do not question the value or necessity of "priorities" nevertheless that too can be carried to illogical conclusions. Before dashing headlong into "priorities" we should have a pretty thorough inventory of both manufacturers' and consumers' stocks. Let's not get the cart before the horse in too many places. It is likely to hold up rather than speed up defense.

15 YEARS AGO

From Our Files of March, 1926

Commonwealth Division of Mathieson Alkali announces production of Vanillin.

Heyden Chemical acquires Norvell Chemical.

Dr. Samuel C. Lind, Fixed Nitrogen Research Laboratory, receives Nichols Medal.

The Chandler Gold Medal is awarded to Dr. Samuel W. Parr, Illinois.

George Eastman, president, Eastman-Kodak, sails for a lion hunting trip in East Africa.

We profess ignorance as to the exact identity of one Raymond L. Hoadley who authored an article in the *N. Y. Herald-Tribune* (Sunday, March 2) on the subject of chemical warfare, but we violently disagree with the following statement: "In 1917 the United States was unprepared for chemical attack, having neither a chemical service in the Army nor a chemical industry to back it up." Apparently the popular belief that the United States had no chemical industry prior to World War I will not down.

Do not let that resolve to send on your contribution to the Chemist Advisory Council go the way of most New Year's promises. The Council is passing through a critical period and needs the help of every man who believes in the professional status of chemists and chemical engineers. Nor will the Council refuse contributions from non-technical members of the chemical and allied fields. Right now—before you forget it—send that dollar, five dollars or ten dollars to the Chemist Advisory Council, Inc., 60 E. 42nd st., N. Y. City. Let us show the world that the chemist and the chemical engineer can take just as good care of and is just as solicitous for his less-fortunate fellow-workers as are the doctors, the dentists, or the lawyers. A dollar a year from every chemist and chemical engineer earning 35 dollars or more would amply underwrite the activities of the Council for 12 months. That is, indeed, very little to ask, and for that matter, to give.

If you haven't read the survey of activities of chemists in the recent issue of *The Chemist*, official publication of the American Institute of Chemists, we suggest by all means that you secure a copy. The Washington Chapter of the A. I. C. is to be congratulated on this splendid job. We know, of course, a great deal about what chemists are accomplishing in scientific matters, but we know precious little pertinent data about him as an individual and as a professional man.

For the April issue we have arranged what we think you will agree is a very interesting and diversified list of timely features: Langbourne M. Williams, Jr., president, Cuban-American Manganese, will discuss manganese and its relationship to the National Defense Program; Maurice Crass, Jr., Manufacturing Chemists' Association, will tell the story of raw materials used in the match industry. We wish we had space to tell you more of the details, but here are the names of some of the April authors: Walter S. Landis, vice-president of Cyanamid; M. B. Hopkins, president of Standard Alcohol; George H. Priest, Jr., Director, technical field service, National Paint, Varnish & Lacquer Association.

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Current Statistics (Feb. 28, 1941)—p. 76

WEEKLY STATISTICS OF BUSINESS

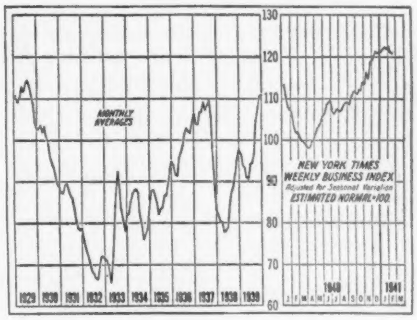
Week Ending	Carloadings 1941	Carloadings 1940	Carloadings % of Change	Electrical Output† 1941	Electrical Output† 1940	Electrical Output† % of Change	Jour. of Com. Price Index	*Nat'l Fertilizer Ass'n Price Indices Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher Commodity Index
Jan. 25......	710,752	650,187	+ 9.3	2,829,959	2,565,958	+10.3	82.5	103.9	75.0	106.0	104.0	100.6	78.8	96.5	122.2	86.1
Feb. 1......	714,323	657,830	+ 8.6	2,829,690	2,541,358	+11.3	81.4	103.9	73.4	106.0	104.0	99.8	78.8	97.1	122.7	85.7
Feb. 8......	710,196	627,429	+13.2	2,823,651	2,522,514	+11.9	82.3	103.9	73.8	106.0	104.0	99.9	78.6	96.9	121.1	85.4
Feb. 15......	721,176	608,237	+18.6	2,810,419	2,475,574	+13.5	82.6	104.0	75.2	105.8	104.0	101.1	78.7	97.1	121.1	85.4

† K.W.H. 000 omitted. * Base period changed Jan. 4 from 1926-1928 average to 1935-1939 average as 100.

MONTHLY STATISTICS

CHEMICAL:	Jan. 1941	Jan. 1940	Dec. 1940	Dec. 1939	Nov. 1940	Nov. 1939
Acid, sulfuric (expressed as 50° Baumé, short tons, Bureau of the Census)						
Total prod. by fert. mfrs.	......	......	223,131	219,838	216,290	208,461
Consumpt. in mfr. fert.	......	......	178,193	172,332	179,677	176,860
Stocks end of month	......	......	100,246	83,814	110,939	74,027
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof gal..	......	......	......	22,080,109	23,353,811	21,786,763
Comp. denat. prod., wine gal...	......	......	......	655,916	2,269,812	2,843,257
Removed, wine gal.	......	......	......	675,899	2,329,613	2,902,792
Stocks end of mo., wine gal...	......	......	......	304,976	516,517	352,807
Spec. denat. prod., wine gal. ...	......	......	......	10,502,486	10,888,394	10,221,265
Removed, wine gal.	......	......	......	10,758,595	11,214,792	10,168,270
Stocks end of mo., wine gal...	......	......	......	868,494	1,069,003	1,128,344
Ammonia sulfate prod., tons *a*..	64,669.5	60,393	64,381.5	60,636	62,843	59,745
Benzol prod., gal. *b*	13,130,000	11,424,000	12,528,000	11,811,000	11,861,000	11,230,000
Byproduct coke, prod., tons *a*..	4,932,989	4,707,068	4,890,030	4,703,400	4,749,921	4,566,573
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	719,336	878,316	715,420	750,269	661,258	982,732
Sheets, ship., lbs.	704,497	749,002	701,292	830,164	730,384	861 442
Rods, prod., lbs.	349,402	291,806	302,198	283,258	306,670	286,736
Rods, ship., lbs.	329,138	275,316	273,640	298,140	305,657	295,438
Tubes, prod., lbs.	97,794	68,702	91,219	55,358	92,766	91,391
Tubes, ship., lbs.	78,760	56,805	93,060	70,356	94,958	86,820
Cellulose acetate, sheets, rod, tubes						
Production, lbs.	616,525	857,277	867,234	987,017	934,006	725,119
Shipments, lbs.	674,574	751,429	733,014	1,029,572	1,036,674	793,028
Molding comp., ship.; lbs. ...	1,583,885	1,023,808	1,317,352	1,135,205	1,410,496	1,119,050
Methanol (Bureau of the Census)						
Production, crude, gals.	449,529	457,271	483,953	434,021	467,976	479,622
Production, synthetic, gals.	3,420,013	3,452,677	3,913,370	4,184,479	4,439,905	4,611,707
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds...	3,056,526	2,909,785	3,239,784	2,867,168	3,318,461	3,351,950
Heavy goods, ship., linear yds..	2,824,339	2,143,625	2,478,374	2,280,890	2,457,154	2,204,021
Pyroxylin spreads, lbs. *c*	3,993,335	5,131,394	5,462,519	5,038,160	5,775,919	5,413,300
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*..	......	......	......	......	$17,643	$19,321
Crude sulfur *d*	......	......	......	......	$882	$777
Coal-tar chemicals *d*	......	......	......	......	$2,213	$1,813
Industrial chemicals *d*	......	......	......	......	$4,670	$4,464
Imports						
Chemicals and related prod. *d*..	......	......	......	......	$3,000	$14,000
Coal-tar chemicals *d*	......	......	......	......	$560	$1,567
Industrial chemicals *d*	......	......	......	......	$782	$1,465
Employment (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	......	......	......	122.3	125.3	122.6
Other than petroleum	......	......	......	122.2	126.3	122.3
Chemicals	......	......	......	137.4	148.6	137.7
Explosives	......	......	......	107.8	147.2	106.1
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	......	......	......	133.3	139.6	133.1
Other than petroleum	......	......	......	132.0	141.6	131.6
Chemicals	......	......	......	162.1	182.6	161,5
Explosives	......	......	......	128.7	186.6	127.6
Price index chemicals*	78.6	77.7	77.7	81.1	85.1	85.2
Drugs & Pharmaceuticals* ...	96.5	81.3	96.2	78.1	95.9	79.7
Fert. mat.*	70.7	71.3	70.0	74.5	69.9	69.8
Paint and paint mat.	86.7	87.2	85.4	85.5	85.7	84.9
FERTILIZER:						
Exports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials ...	......	......	136,581	70,,905	116,416	792.70
Total phosphate rock	......	......	101,543	30,148	84,335	45,822
Total potash fertilizers	......	......	7,012	5,103	11,270	12,751
Imports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials ...	......	......	64,272	132,461	60,310	109,391
Sodium nitrate	......	......	27,718	59,518	28,478	66,407
Total potash fertilizer	......	......	7,903	18,161	5,625	4,214

INDUSTRIAL TRENDS



Business: Business and industrial activity continues to hold more or less steady at high levels. Some declines were experienced but were less than seasonal. The New York Times Weekly Business Index has fluctuated over a small range and resulted in a reduction from the record of 123.7 in week ending Jan. 18 to 121.1 for week ending Feb. 15.

The seasonally adjusted index of the Federal Reserve Board advanced one point during January to 139 for the month.

Cautious buying policies which prevailed in retail trade up to December are now being abandoned and inventories are expanding in most districts to keep up with sales.

Electric Output: Electric power production continues in large volume to supply needs of expanded industrial activity. For the month of February production of electric power was 13.6% above similar period of last year.

Automotive: Estimates of a production of 500,000 units indicate that February output was the highest of any February since 1929. Operations are expected to be maintained at about present rate for next few months at least even if it is necessary to plan for diversion of more manufacturing facilities to armament or other defense production.

January factory sales of automobiles set a new record for that month. These sales were stimulated by heavy purchases by dealers against continued strong retail demand (January retail sales were 30% ahead of same month a year ago) and in anticipation of pos-

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sible curtailment of production later in year.

Steel: Production set new record in January with an output of 6,943,084 tons equal to 97.1% of capacity. Incoming business kept consistently ahead of both production and shipments.

Carloadings: Freight carloadings continue gains. In week ended March 1, estimates show more than seasonal gain to about 761,000 cars, highest for any week since Nov. 9, and highest for any like week since 1930.

Construction: January engineering construction awards of $584,549,000 reached second highest level ever reported, being exceeded only by record-breaking volume of last October, according to reports by "Engineering News Record."

Prospects for spring months are unusually favorable. A large volume of unfilled contracts for all types of construction was carried over from last year and, despite smaller defense awards in January, total awards continue to run well ahead of 1940.

Retail Trade: Consumer retail buying is at best level since 1930. Sales of eighteen chain and mail order companies to report for February amounted to $173,045,609, compared with $153,745,397 last year, an increase of 12.5%. High level is attributed to increased purchasing power and stocking up by some buyers who fear that the defense program may shut off supply of certain consumer goods items later in year.

Commodity Prices: Prices of industrial materials and foodstuffs, generally, showed little change. Some imported commodities, coffee, cocoa, rubber, tin rose slightly, declines were reported for livestock and meats, hides, grains, lumber and scrap metals. Some finished products, particularly textiles showed advances.

Textiles: An increased upward trend in retail demand superimposed upon large government orders keep activity at a high rate. Cotton, wool and rayon are particularly active with orders that will continue operations at a high level for some months.

Outlook: Large industrial production has now begun to show in a high level of purchasing power by the public. According to Department of Commerce data, consumer purchasing power is now at highest level since February, 1930. There seems to be every indication that industrial production will continue high for the next few years so that we may expect a rising cycle of purchasing and production complementing each other.

MONTHLY STATISTICS (cont'd)

FERTILIZER: (Cont'd)	Jan. 1941	Jan. 1940	Dec. 1940	Dec. 1939	Nov. 1940	Nov. 1939
Superphosphate e (Nat. Fert. Association)						
Production, total	......	......	359,890	359,432	345,352	371,818
Shipments, total	......	......	194,695	220,404	176,928	166,230
Northern area	......	......	86,089	111,688	71,201	91,219
Southern area	......	......	108,606	108,716	105,727	75,011
Stocks, end of month, total	......	......	1,785,445	1,689,997	1,571,998	1,508,231
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	545,772	459,023	183,604	189,564	106,119	110,205
Total, 12 southern	520,644	410,389	182,646	187,942	105,003	108,139
Total, 5 midwest	25,128	48,634	958	1,622	1,116	2,066
Fertilizer employment *i*	......	......	......	101.8	90.2	91.2
Fertilizer payrolls *i*	......	......	......	81.8	74.3	76.0
Value imports, fert. and mat. *d*	......	......	......	$2,920	$1,242	$2,159
GENERAL:						
Acceptances outst'd'g *f*	$212	$229	$208	$232	$196,	$222
Coal prod., anthracite, tons	4,975,000	5,622,000	4,699,000	3,862,000	3,869,000	3,946,000
Coal prod., bituminous, tons	43,905,000	44,976,000	41,400,000	37,283,000	40,012,000	42,835,000
Com. paper outst'd'g *f*	$232	$219	$217	$209	$231	$214
Failures, Dun & Bradstreet	1,120	1,237	1,086	882	1,024	886
Factory payrolls *i*	......	......	122.4	103.9	114.7	101.8
Factory employment *i*	......	......	116.2	104.0	110.7	103.8
Merchandise imports *d*	......	......	$253,099	$246,807	$223,430	$235,402
Merchandise exports *d*	......	......	$322,257	$368,046	$327,685	$292,734
GENERAL MANUFACTURING:						
Automotive production	500,931	432,279	483,567	452,142	487,352	351,785
Boot and Shoe prod., pairs	36,631,597	33,884,856	31,425,385	......	30,132,321	32,129,156
Bldg. contracts, Dodge *j*	$305,205	$196,191	$456,189	354,098	$380,347	$299,847
Newsprint prod., U. S. tons	89,124	84,126	80,837	77,836	85,338	78,886
Newsprint prod., Canada, tons.	261,298	251,032	252,897	240,656	282,344	288,726
Glass containers, gross‡	......	......	4,203	4,046	4,352	4,300
Plate glass prod., sq. ft.	......	......	17,491,218	12,691,262	16,059,294	15,812,000
Window glass prod., boxes	......	......	1,457,933	1,188,940	1,264,057	1,142,570
Steel ingot prod., tons	6,943,084	5,619,000	6,493,849	5,164,420	6,282,824	5,462,616
% steel capacity	97.1	83.18	94.1	85.57	96.49	93.26
Pig iron prod., tons	4,663,695	4,032,022	4,414,602	4,220.536	4,403,230	3,720,436
U.S. cons'pt. crude rub., lg. tons	64,225	56.539	56,539	49,636	54,652	55,677
Tire shipments	4,846,991	4,270,137	4,971,504	4,740,112	5,136,744	4,278,321
Tire production	5,472,043	4,953.585	4,998,520	4,479,386	4,837,501	4,865,192
Tire inventories	9,797,253	9,347,953	9,178,537	8,688,215	9,118,243	8,917,604
Cotton consumpt., bales	843,274	731,793	775,472	650,123	744,088	718,721
Cotton spindles oper.	22,820,724	22,880,270	22,817,658	24,943,302	22,685,968	22,784,776
Silk deliveries, bales	24,639	26,841	17,792	21,128	36,374	32,241
Wool consumption *s*	46.4	34.4	46.6	32.6	45.8	38.7
Rayon deliv., lbs.	34,300,000	31,800,000	34,000,000	32,000,000	35,000,000	33,300,000
Rayon employment *i*	......	......	......	312.2	314.5	313.4
Rayon payrolls *i*	......	......	......	314.0	331.4	310.4
Soap employment *i*	......	......	......	84.9	84.3	88.6
Soap payrolls *i*	......	......	......	102.3	99.7	104.4
Paper and pulp employment *i*	......	......	......	115.6	115.8	115.2
Paper and pulp payrolls *i*	......	......	......	122.7	123.7	124.6
Leather employment *i*	......	......	......	86.9	84.0	87.9
Leather payrolls *i*	......	......	......	86.5	83.1	87.2
Glass employment *i*	......	......	......	109.0	117.0	109.3
Glass payrolls *i*	......	......	......	118.3	131.0	121.0
Rubber prod. employment *i*	......	......	......	92.9	94.7	93.9
Rubber prod. payrolls *i*	......	......	......	99.1	102.7	99.8
Dyeing and fin. employment *i*	......	......	......	133.0	131.2	134.2
Dyeing and fin. payrolls *i*	......	......	......	116.5	113.0	115.2
MISCELLANEOUS:						
Oils & Fats Index ('26 = 100)[1]	......	60,656	......	......	......	58.4
Gasoline prod., *p*	......	......	52,508	52,464	50,892	60,656
Cottonseed oil consumpt., bbls.	383,739	266,410	276,102	231,074	285,655	266,438
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 680 establishments, dollars	34,604,629	28,666,635	28,308,153	26,810,005	31,892,256	30,472,039
Trade sales (680 estbts.) dollars	16,314,158	13,549,867	12,520,203	12,687,134	14,980,510	15,115,083
Industrial sales, total, dollars	15,092,044	12,317,340	13,434,963	11,589,021	14,048,944	12,842,932
Paint & Varnish, employ. *i*	......	......	......	124.4	126.0	125.1
Paint & Varnish, payrolls *i*	......	......	......	130.0	136.2	131.5

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100, adjusted to 1937 Census totals; *j* 000 omitted. 37 states; *p* Thousands of barrels, 42 gallons each; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census; *t* 387 identical manufacturers, Bureau of the Census, quantity expressed in dozen pairs; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce; *z* Units are millions of lbs.; ‡ 000 omitted; *New series beginning March, 1940; [1] Revised series beginning February, 1940.

Chemical Finances

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Monsanto Sales Reach New Peak

Monsanto Chemical Co., in its annual report, shows a gain of 18% in domestic sales to a new peak at $45,607,000. Net income before taxes gained 50% but after taxes this was reduced to a gain of only 5.6%.

Indicating the tendency of chemical companies to be ultra conservative in their own bookkeeping on war-time plants, Monsanto has adopted a policy of writing off in one year plant facilities that may prove of temporary value when the national emergency is ended. Write downs on this account amounted to $402,800 or around 30 cents a share last year.

Report of the company and its American subsidiaries for year ended December 31, 1940, shows net income of $5,467,774 after depreciation, obsolescence, federal income and excess profits taxes, minority interest, etc., equal after dividends paid on $4.50 cumulative preferred stock, to $4.04 a share (par $10) on 1,241,694 shares of common stock. The above earnings exclude dividend of $270,375 received from British subsidiary.

This compares with net income of the company and its American subsidiaries in 1939 of $5,174,840, equal after preferred dividends, to $3.81 a common share.

Dividends and Dates

Name	Div.	Stock Record	Payable
Abbott Laboratories (quar.)	$0.40	Mar. 12	Mar. 31
Extra	.10	Mar. 12	Mar. 31
Preferred (quar.)	1.125	Apr. 1	Apr. 15
Atlas Powder Co.	.75	Feb. 28	Mar. 10
Colgate-Palmolive-Peet, pref. (quar.)	1.0625	Mar. 11	Mar. 31
Columbian Carbon (quar.)	1.00	Feb. 21	Mar. 10
du Pont (E. I.) de Nemours (interim)	1.75	Feb. 24	Mar. 14
Preferred (quar.)	1.125	Apr. 10	Apr. 25
Durez Plastic & Chemical	.50	Feb. 17	Mar. 3
7% pref. (quar.)	1.75	Feb. 17	Mar. 3
6% pref. (quar.)	.375	Feb. 17	Mar. 3
Eastman Kodak Co. (quar.)	1.50	Mar. 5	Apr. 1
pref. (quar.)	1.50	Mar. 5	Apr. 1
General Printing Ink Corp.	.15	Mar. 14	Apr. 1
pref. (quar.)	1.50	Mar. 14	Apr. 1
Harshaw Chem. Co. 4½% cum. conv. pref. (quar.)	.5625	Feb. 14	Mar. 1
Heyden Chemical Corp.	.75	Feb. 20	Mar. 1
Metal & Thermit Corp. 7% pref. (quar.)	1.75	Mar. 30	Mar. 31
New Common (Initial)	.30	Mar. 1	Mar. 10
Monroe Chemical Co. pref. (quar.)	.875	Mar. 8	Apr. 1
Monsanto Chemical Co. $4.25 pref. A (semi-annual)	2.25	May 10	June 2
$4.25 pref. B (semi-annual)	2.25	May 10	June 2
New Jersey Zinc Co.	.50	Feb. 18	Mar. 10
Norwich Pharmacal Co.	.25	Feb. 21	Mar. 10
Pennsylvania Salt Mfg. Co.	2.00	Feb. 28	Mar. 15
Procter & Gamble Co. 5% pref. (quar.)	1.25	Feb. 25	Mar. 15
Sharp & Dohme, Inc. (initial)	.20	Feb. 18	Mar. 1
Sherwin-Williams Co., pref. (quar.)	1.25	Feb. 15	Mar. 1
United Chemicals Participating pref.	.75	Feb. 10	Mar. 1

Earnings Statements Summarized

Company:	Annual dividends	Net income 1940	Net income 1939	Common share earnings 1940	Common share earnings 1939	Surplus after dividends 1940	Surplus after dividends 1939
Abbott Laboratories (ABT):							
n Year, December 31	y$2.15	$2,239,408	$2,048,094	$2.89	$2.61	......	......
Allied Laboratories, Inc.:							
Year, December 31	w.15	146,984	388,499	h.59	h1.73	......	......
Catalin Corp. of America:							
Year, December 31	y.25	174,727	165,315	.32	.31	......	......
Celanese Corp. of America (CZ):							
Year, December 31	x1.25	6,376,896	6,374,100	h3.38	h3.53	$2,475,835	$3,654,967
Commercial Solvents Corp. (CV):							
Year, December 31	y.25	2,387,321	1,600,390	.90	.61	1,728,102	......
Corn Products Refining Co. (CFG):							
Year, December 31	3.00	9,581,054	10,120,398	3.10	3.32	270,888	810,232
du Pont de Nemours & Co., E. I,. (DD):							
Year, December 31	y7.00	86,945,173	93,218,664	7.23	7.70	2,040,425	7,299,710
General Printing Ink Corp. (GPI):							
Year, December 31	y.65	836,855	894,367	.86	.94	191,159	101,558
Monsanto Chemical Co. and American subs. (MTC):							
Year, December 31	k3.00	5,467,774	5,174,840	4.04	3.81	......	......
National Lead Co. (LT):							
Year, December 31	y.87½	6,102,702	5,780,500	1.34	1.23	1,433,167	1,110,965
National Oil Products Co. (NOP):							
Year, December 31	y1.85	704,967	700,401	3.92	3.89	......	......
New Jersey Zinc Co.:							
December 31 quarter	k3.50	3,122,351	1,791,116	1.59	.91	......	......
Year, December 31	k3.50	8,236,815	5,299,055	4.19	2.70	1,365,391	390,895
Norwich Pharmacal Co. (NOR):							
Year, December 31	k1.00	757,883	783,282	.95	.98	d39,995	d14,854
Pennsylvania Salt Mfg. Co.:							
Twelve months, Dec. 31	k9.00	1,701,333	1,577,569	11.34	10.52	......	......
Sharp & Dohme, Inc. (SDH):							
December 31 quarter	y.20	292,946	*......	.12	..	......	......
n Year, December 31	y.20	1,174,902	902,271	.48	.13	......	......
St. Joseph Lead Co. (JO):							
Year, December 31	y2.50	5,111,942	5,292,907	2.61	2.70	711,662	1,381,547
United Carbon Co. (UCB):							
Year, December 31	y3.00	1,336,331	1,518,266	3.36	3.81	142,676	324,611
United Chemicals, Inc.:							
Year, December 28	f...	170,751	221,766	p7.30	p8.77	......	......
Vick Chemical Co. (VIK):							
** December 31 quarter	y3.00	907,634	879,091	h1.33	h1.26	......	......
Six months, December 31	y3.00	1,951,881	1,951,030	h2.86	h2.80	......	......
Victor Chemical Works (VCW):							
Year, December 31	k1.40	1,007,504	1,104,404	1.45	1.59	......	......
Westvaco Chlorine Products Corp. (WCO):							
Year, December 28	y1.85	1,316,401	1,275,078	h2.96	h2.91	266,419	287,258

a On Class A shares; *b* On Class B shares; *c* On Combined Class A and Class B shares; *d* Deficit. *f* No common dividend; *j* On average number of shares; *k* For the year 1940; *p* On Preferred stock; On Class A shares; *y* Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement; ‡ Indicated quarterly earnings as shown by comparison of company's reports for the 6 and 9 months periods; § Plus extras; *n* Preliminary statement; *h* On shares outstanding at close of respective periods. ** Indicated quarterly earnings as shown by comparison of company's reports for 1st quarter of fiscal year and the six months period. ‡‡ Indicated earnings as compiled from quarterly reports. † Net loss. * Not available. ¶¶ Before interest on income notes. *x* Paid on or declared in last 12 months plus extra stock. *w* Last dividend declared, period not announced by company.

Commercial Solvents' Profits Up 50 per cent.

Earnings of Commercial Solvents last year showed a gain of nearly 50% over '39, recovering to the best levels since '35. Net earnings of $2,387,321, or 90 cents a share, for '40, compared with $1,600,389, or 60 cents a share for '39 and a further gain is expected this year.

After the dip in earnings several years ago, followed by a financial housecleaning and a renewed emphasis on research, the company seems back on the road to expanding profits from new fields. Earnings last year were back close to the average level of ten years ago although not back to the peaks set in '28 and '29.

The company's comparatively new products in the vitamin field are becoming of increasing importance in earnings and further gains are indicated this year.

The company spent $600,000 on new manufacturing facilities last year, principally for the completion of nitro-paraffin and Solvamin plants at Peoria and the erection of a new methylamine plant at Terre Haute.

Price Trend of Representative Chemical Company Stocks

	Jan. 25	Feb. 1	Feb. 8	Feb. 15	Feb. 22	Net gain or loss last mo.	Price on Feb. 24, 1941	1941 High	1941 Low
Air Reduction Co.	41½	40¾	40	37½	38½	—3	50	42½	36¾
Allied Chemical & Dye	155	151⅜	150½	145	146½	—8½	178½	165	144⅞
Amer. Agric. Chem.	16½	15¼	15¼	14½	15	—1½	20⅛	17¾	14⅜
American Cyanamid "B"	34¾	33¼	33½	31	33½	—1¼	37	38	31
Columbian Carbon	80	79¼	79½	78⅛	78	—2	93	80⅛	75
Commercial Solvents	10¼	9⅞	9⅞	8⅝	9	—¾	13⅞	11⅜	8⅜
Dow Chemical Co.	134	130	130	124½	123¾	—10¼	152½	141¾	122
du Pont de Nemours	155	150⅜	147⅞	140⅝	144½	—10½	184	164¾	140
Hercules Powder	73½	69	70	68	68¼	—5¼	89¾	77½	67½
Mathieson Alkali	29⅞	28¼	26⅜	25	25¾	—4⅛	29¾	30	24½
Monsanto Chem. Co.	80	80½	80	78	79½	—½	109	88½	77
Standard Oil of N. J.	34⅞	33¾	35	33¾	34⅜	—⅛	43⅛	36½	33
Texas Gulf Sulphur	37¾	36¼	36½	35⅛	35¼	—2½	34⅞	38	34¾
Union Carbide & Carbon	68	64¾	65⅜	61½	64¼	—3¾	84⅞	70⅞	60
U. S. Industrial Alcohol	26⅜	24	25	22⅛	24	—2⅜	21½	28¾	21½

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Chemical Stocks and Bonds

Last (Feb. 1941)	High (Feb. 1941)	Low (Feb. 1941)	High (1940)	Low (1940)	High (1939)	Low (1939)	Sales: Number of shares February 1941	Sales: 1941	Stocks	Par $	Shares Listed	Dividends 1940*	Earnings** $-per-share-$ 1940	1939	1938
NEW YORK STOCK EXCHANGE															
48½	53	46	70¼	49¼	71½	53	3,700	6,500	Abbott Labs.	No	752,468	2.15	...	2.61	2.43
38¼	42½	36¾	58⅛	36½	68	45¼	27,100	72,200	Air Reduction	No	2,563,992	1.75	...	1.98	1.47
146	165	144⅞	182	135½	200½	151½	6,800	14,000	Allied Chem & Dye	No	2,214,099	6.00	...	9.50	5.92
14⅜	17¾	14⅜	21	12⅛	24½	16	3,300	13,200	Amer. Agric. Chem.	No	627,987	1.20	...	1.22	2.23
5	6⅛	4⅝	8¼	4⅛	11⅞	5½	3,500	11,000	Amer. Com. Alcohol	No	280,934	...	...	—.40	—2.05
28¼	30	26	35½	23	37	21	500	1,800	Archer-Dan.-Midland	No	545,416	1.40	5.71	3.82	.43
63	72¼	63	80½	57	71	50	700	2,100	Atlas Powder Co.	No	252,278	4.25	...	3.82	2.69
113	118½	112¾	124¾	112½	127	116	340	580	5% conv. cum. pfd.	100	68,597	5.00	...	18.94	14.77
23¾	28⅜	22	35½	20	30¼	13⅝	13,700	23,400	Celanese Corp. Amer.	No	1,000,000	1.25	...	3.53	.20
118¾	120¾	118	121	105½	109⅞	84	1,690	2,910	prior pfd.	100	164,818	7.00	...	37.72	15.05
12¼	12⅞	11⅛	20	10⅛	18	11½	10,700	25,400	Colgate-Palm.-Peet	No	1,962,087	1.00	...	2.74	1.77
77⅛	80⅛	75	98¾	71	96	73	1,900	4,400	Columbian Carbon	No	537,406	4.60	...	5.32	5.18
9¼	11⅜	8⅜	16⅝	8	16	8⅝	26,500	64,800	Commercial Solvents	No	2,636,878	.25	.91	.61	—.11
45¾	47½	44¼	65⅛	40¼	67½	54⅞	10,400	37,700	Corn Products	25	2,530,000	3.00	...	3.32	3.18
176¼	182½	175	184	165	177	150	920	1,750	7% cum. pfd.	100	245,738	7.00	...	41.18	30.69
14¾	17¼	13⅞	23¼	12½	32⅝	18	2,200	5,630	Devoe & Rayn. A.	No	95,000	.25	1.14	2.08	—1.72
124	141¾	122	171	127¼	144⅝	101½	5,200	9,200	Dow Chemical	No	1,034,988	3.00	...	3.76	3.91
144½	164¾	140	189¼	146½	188½	126¼	28,700	53,700	DuPont de Nemours	20	11,065,762	7.00	7.23	7.70	3.74
123	125⅞	120⅞	129⅜	114	124⅛	112	2,900	5,800	4½% pfd.	No	1,688,850	4.50	...	52.25	87.27
132	142	125½	166¾	117	186⅛	138⅛	8,000	15,700	Eastman Kodak	No	2,476,013	6.00	...	8.55	7.54
167	182½	165	180	155	183½	155½	410	680	6% cum.	100	61,657	6.00	...	349.31	281.22
36	39	33	39¼	24¾	36	18¼	7,600	23,700	Freeport Sulphur	10	796,380	2.00	3.81	2.76	1.87
7	7½	6½	10	5½	10⅞	7	3,500	7,200	Gen. Printing Ink	1	735,960	.60	...	.94	.62
13⅛	14¾	12¾	19⅝	11	24½	14	6,800	16,500	Glidden Co.	No	829,989	1.00	...	1.70	—.28
40¼	46	40¼	45	30	47	34	800	2,200	4½% cum. pfd.	50	199,940	2.25	...	4.27	1.03
86	95	86	113¼	89⅞	112¼	93	1,400	3,000	Hazel Atlas	25	434,409	5.00	...	6.64	4.97
68¾	77½	67½	100½	69	101½	63	4,000	13,900	Hercules Powder	No	1,316,710	2.85	4.01	3.65	1.95
126½	128¼	126½	133½	126¼	135½	128½	50	220	6% cum. pfd.	100	96,194	6.00	...	60.87	35.31
24	26	22¼	29	16⅜	29½	16⅝	8,800	14,800	Industrial Rayon	No	759,325	2.00	3.15	1.77	.24
22⅝	25½	22⅝	47⅝	21¼	46¼	17½	1,400	4,600	Interchem.	No	290,320	1.60	...	4.10	.32
110¼	113¼	110¼	113	91	109½	90	560	1,020	6% pfd.	100	65,661	6.00	...	24.27	7.39
1¾	2⅛	1½	2½	1	3⅝	1½	12,100	17,000	Intern. Agricul.	No	436,048	...	...	—1.32	—0.003
40½	49	39	44	18⅛	41	16	3,300	11,700	7% cum. pfd.	100	100,000	...	...	1.26	7.01
24¾	26¾	23⅜	38⅞	19⅜	55⅝	35	57,800	143,000	Intern. Nickel	No	14,584,025	2.00	...	2.39	2.09
38¼	41¼	38¼	39⅝	26⅞	38	29	900	2,300	Intern. Salt	No	240,000	2.50	3.98	1.92	2.29
19	20¼	18¾	23¾	14⅝	22½	14½	400	1,700	Kellogg (Spencer)	No	509,213	1.60	...	1.39	.71
35½	45⅜	35	53⅝	30	56¾	36½	24,000	43,100	Libbey Owens Ford	No	2,513,258	3.50	3.97	3.21	1.57
15¼	16⅝	14¾	18⅝	10⅛	19	13½	4,200	10,000	Liquid Carbonic	No	700,000	1.00	1.72	1.62	1.81
26¼	30	24½	32¾	21	37⅝	20¾	5,100	9,200	Mathieson Alkali	No	828,171	1.50	...	1.12	1.01
79⅜	88½	77	119	79	114¾	85¾	7,400	18,200	Monsanto Chem.	No	1,241,816	3.00	...	4.01	2.35
116	117	115	119	110	121	110	210	470	4½% pfd. A.	No	50,000	4.50	...	54.29	31.51
118	120	118	122	113½	122½	112	250	490	4½% pfd. B.	No	50,000	4.50	...	54.29	31.51
16¼	17¾	15¼	22½	14⅛	27½	17⅞	13,800	35,900	National Lead	10	3,095,100	.87	1.34	1.23	.75
173	176	172	176	160	173½	152	1,000	1,500	7% cum. "A" pfd.	100	213,793	7.00	...	27.04	20.03
145	154	145	153¾	132	145	132	300	500	6% cum. "B" pfd.	100	103,277	6.00	...	55.30	35.97
28	31	26	44	28¾	46	28½	1,700	9,900	National Oil Products	4	179,829	1.35	3.92	3.89	2.23
6¾	8¾	6¼	14¼	6⅛	17¾	8½	11,300	20,300	Newport Industries	1	620,459	.30	...	.66	—.08
43⅝	49¼	40⅛	64⅝	42	70	50	16,100	35,800	Owens-Illinois Glass	12.50	2,661,204	2.00	2.71	3.17	2.02
52¼	58¼	51¼	71¾	53	66	50⅝	13,400	31,000	Procter & Gamble	No	6,325,087	2.75	...	3.80	2.59
118	119½	117⅝	118½	112½	119¾	112	100	600	5% pfd.	100	169,517	5.00	...	298.55	101.81
11¼	12⅜	10⅛	13⅛	7⅝	17¼	9⅞	17,800	37,400	Shell Union Oil	No	13,070,625	.75	...	.77	.70
18⅞	22⅜	18⅞	23¼	12¼	29½	15½	3,200	9,500	Skelly Oil	No	995,349	1.25	...	1.99	2.27
26	27⅞	25⅝	29	20⅜	30	22¾	40,300	103,700	S. O. Indiana	25	15,272,020	1.50	...	2.24	1.82
34⅜	36½	33	46½	29⅞	53½	38	95,100	260,100	S. O. New Jersey	25	26,618,065	1.75	...	3.27	2.86
8	9⅛	7¾	9¼	4¼	9⅛	4	9,800	19,900	Tenn. Corp.	5	853,696	.25	...	.41	.40
35½	40¼	34½	47⅝	33	50¾	32½	47,300	116,700	Texas Corp.	25	10,876,882	2.00	...	3.02	2.13
35½	38	34¾	37¼	26⅞	38½	26	13,600	35,500	Texas Gulf Sulphur	No	3,840,000	2.50	...	2.04	1.81
65	70⅞	60	88⅜	59⅞	94¼	65½	48,300	93,700	Union Carbide & Carbon	No	9,277,288	2.30	...	3.86	2.77
44½	50½	44½	65⅝	42½	69½	52	3,200	7,000	United Carbon	No	397,885	3.00	...	3.81	3.78
24¼	28¾	21½	28	14	29⅝	13½	6,600	26,100	U. S. Indus. Alcohol	No	391,238	...	...	.20	—1.08
27⅝	34⅛	26	43⅞	25	40	16	10,100	20,700	Vanadium Corp. Amer.	No	377,140	1.50	...	3.25	.61
21	24¾	20½	31½	19	29¾	18¼	1,400	3,600	Victor Chem.	5	696,000	1.40	...	1.59	1.05
2	2½	2	4⅛	1¾	5¾	2½	2,800	5,900	Virginia-Caro. Chem.	No	486,122	...	...	—1.57	—1.80
21¼	27¼	20	31¾	14	33¾	17	2,800	6,300	6% cum. part. pfd.	100	213,052	...	...	2.41	1.90
27½	36	27½	38½	27¾	39¼	15¼	1,300	2,500	Westvaco Chlorine	No	339,362	1.85	...	2.81	1.52
108	110¼	107	109⅞	108	...	...	490	1,180	cum. pfd.	No	60,000	4.50	...	...	...
NEW YORK STOCK EXCHANGE															
34⅛	38	31	39⅞	26	35¾	18⅝	25,800	52,700	Amer. Cyanamid "B"	10	2,618,387	1.10	...	2.07	.91
131½	134	126½	134⅞	98	112¾	76	1,575	3,025	Celanese, 7% cum. 1st pfd.	100	148,179	9.72	...	34.17	8.95
4⅞	5¼	4	6¾	2⅝	6¾	3	1,600	2,000	Celluloid Corp.	15	194,952	...	...	—.70	—2.73
...	...	...	7¾	2	7⅜	4½	......	......	Courtauld's Ltd.	£1	24,000,000	.16	...	4.92%	.26%
7⅝	7¾	7⅝	8⅛	5	9¼	5	1,900	2,700	Duval Texas Sulphur	No	500,000	.75	...	1.25	.71
68	77¾	65	92	60	68	30	775	2,325	Heyden Chem Corp.	100	125,497	3.00	...	5.98	2.07
78	96¼	77¼	104	65	117	90	5,800	9,700	Pittsburgh Plate Glass	25	2,192,824	5.00	...	4.94	3.00
74	80½	72¼	100	62½	113½	81	2,750	7,500	Sherwin Williams	25	638,927	3.00	...	5.96	2.43
109½	115½	109	114¾	106	116	106½	470	850	5% cum. pfd.	50	132,189	5.00	...	35.08	8.76
PHILADELPHIA STOCK EXCHANGE															
175	182	175	192	158¾	179	135	350	625	Pennsylvania Salt	50	150,000	9.00	...	10.52	6.29

Last (Feb. 1941)	High (Feb. 1941)	Low (Feb. 1941)	High (1940)	Low (1940)	High (1939)	Low (1939)	Sales: February 1941	Sales: 1941	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
103½	104½	100⅝	105¼	100⅛	103¾	98	245,000	359,000	Amer. I. G. Chem. Conv.	1949	5½	M-N	$22,400,000
33½	35	31½	41	27½	41½	19	61,000	123,000	Anglo Chilean Nitrate inc. deb.	1967	4½	J	10,400,000
30	33½	27½	39¾	27	37	21½	131,000	177,000	Lautaro Nitrate inc. deb.	1975	4	J-D	27,200,000
31	38	31	40	21	30	16	......	3,000	Ruhr Chem.	1948	6	A-O	1,500,000
96½	99⅝	96	100¼	93½	95⅝	88⅝	338,000	1,162,000	Shell Union Oil	1954	2½	J-J	85,000,000
103¾	106½	103¾	107	101⅛	106¼	97⅝	123,000	349,000	Standard Oil Co. (New Jersey) deb.	1961	3	J-D	85,000,000
104⅝	105⅝	104	107	100⅝	106½	94¼	211,000	335,000	Standard Oil Co. (New Jersey) deb.	1953	2¾	J-J	50,000,000
105¼	106⅞	104⅝	108¼	102	105⅞	95¼	197,000	250,000	Texas Corp.	1959	3	A-O	40,000,000

* Including extras paid in cash.

** For either fiscal or calendar year.

Naval Stores, Apr. - Sept., 1940
Production, Consumption, Exports, Imports, Prices—p. 13

Naval Stores, Apr.-Sept., 1940

Foreword

This is taken from the fifth semi-annual naval stores report of the Bureau of Agricultural Chemistry and Engineering, U. S. Department of Agriculture, on production, consumption and stocks of naval stores.

If the production figures for the half-year are used as a basis for estimating this season's probable total production, the fact that gum naval stores production is seasonal should be borne in mind. Normally, approximately 72 per cent. of the total annual gum crop is produced from the beginning of April to the end of September. This year unusual weather conditions apparently have affected this percentage for gum naval stores production, and it is generally accepted by the naval stores industry that the 1940-41 season will close earlier than usual. Wood naval stores production, on the other hand, is not seasonal, but is based largely upon probable consumer demand.

As in previous reports, carryover (stocks) of turpentine and rosin is separated into gum and wood products. Stocks of wood rosin do not include so-called "B wood rosin." While sulfate wood turpentine is carried in the regular production and carryover tables, data on "liquid rosin" are in a table separate from gum and wood rosins. Pending the selection of a proper term, we continue to refer to the mixture of resin and fatty acids recovered from the acidulated soap curds obtained in the production of sulfate pulp as "liquid rosin." The term "sulfate wood rosin" refers to the resin acids constituting approximately 42 per cent. of "liquid rosin."

SUMMARY OF TURPENTINE

Supply, Distribution and Carryover (Bbls. 50 gals.)

(By naval stores seasons, beginning Apr. 1 and ending Mar. 31)

	1940-41 6 mos. (Apr.-Sept.) Total	Gum	Wood	1939-40 6 mos. (Apr.-Sept.) Total	Gum	Wood
Supply and Distribution						
U. S. Carryover, Apr. 1	220,267	167,943	52,324	314,323	272,658	41,665
Production	350,192	247,497	102,695	354,702	270,167	84,535
Imports	11,008	11,008	......	11,664	11,664	......
Available Supply	581,467	426,448	155,019	680,689	554,489	126,200
Less Carryover Sept. 30	247,539	198,330	49,209	293,269	267,860	25,409
Appar. Total Consumption	333,928	228,118	105,810	387,420	286,629	100,791
Less Exports	67,742	53,207	14,535	131,125	108,866	22,259
Appar. U. S. Consumption	266,186	174,911	91,275	256,295	177,763	78,532
Carryover (Stocks)						
U. S. Carryover, Apr. 1	220,267	167,943	52,324	314,323	272,658	41,665
U. S. Carryover, Sept. 30	247,539	198,330	49,209	293,269	267,860	25,409
Increase	27,272	30,387	......	......	......	......
Decrease	......	......	3,115	21,054	4,798	16,256

SUMMARY OF ROSIN

Supply, Distribution and Carryover (Bbls. 500 lbs. gross)

(By naval stores seasons, beginning Apr. 1 and ending Mar. 31)

	1940-41 6 mos. (Apr.-Sept.) Total	Gum	Wood	1939-40 6 mos. (Apr.-Sept.) Total	Gum	Wood
Supply and Distribution						
U. S. Carryover Apr. 1	1,569,396	1,409,649	159,747	1,621,970	1,399,124	222,846
Production	1,296,119[4]	819,992[4]	476,127	1,348,183[4]	917,773[4]	430,410
Imports	0	0	0	2,175	2,175	0
Available Supply	2,865,515	2,229,641	635,874	2,972,328	2,319,072	653,256
Less Carryover Sept. 30	1,838,945	1,650,137	188,808	1,728,166	1,606,093	122,073
Appar. Tot. Consump.	1,026,570	579,504	447,066	1,244,162	712,979	531,183
Less Exports	305,789	175,110	130,679	467,754	289,610	178,144
Appar. U. S. Consump.	720,781	404,394	316,387	776,408	423,369	353,039
Carryover (Stocks)						
U. S. Carryover Apr. 1	1,569,396	1,409,649	159,747	1,621,970	1,399,124	222,846
U. S. Carryover Sept. 30	1,838,945	1,650,137	188,808	1,728,166	1,606,093	122,073
Increase	269,549	240,488	29,061	106,196	206,969	......
Decrease	......	......	......	......	......	100,773

[4] Includes reclaimed gum rosin.

Weighted Average Monthly and Season Prices of Gum Spirits of Turpentine—1921-22 to 1940-41[1]

(Based upon Wednesdays and Saturdays closing Savannah Prices)[2]

Season	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Average
	Cents per Gallon												
1921-22	53.17	61.83	52.62	53.06	56.55	65.15	69.04	73.44	74.14	83.86	86.07	80.92	62.62
1922-23	79.50	86.07	106.54	113.07	110.61	123.31	145.94	151.25	130.71	145.87	143.29	147.53	119.82
1923-24	145.32	105.48	94.74	88.73	88.83	91.61	83.86	88.50	86.36	94.88	95.37	95.72	95.22
1924-25	91.82	83.49	77.63	77.66	82.99	82.28	81.43	79.24	77.64	86.40	87.95	86.00	81.30
1925-26	87.39	97.39	92.48	90.08	95.29	106.25	105.56	104.79	93.77	99.72	92.69	93.81	96.66
1926-27	89.86	79.67	80.14	82.07	89.31	86.00	84.75	82.69	80.85	76.07	68.00	67.38	82.62
1927-28	60.61	56.41	51.24	50.64	52.31	49.22	46.71	44.36	49.49	55.03	54.94	54.82	51.38
1928-29	52.06	47.87	50.87	49.83	47.58	46.40	48.18	54.22	55.50	56.47	53.16	52.42	50.54
1929-30	48.78	48.90	46.83	47.11	46.68	49.74	50.82	47.85	48.13	49.42	50.12	50.67	48.28
1930-31	48.42	43.51	41.33	37.56	35.32	38.26	35.60	37.03	36.14	38.11	39.97	47.81	39.34
1931-32	50.44	49.42	50.69	39.77	31.40	31.88	31.17	35.21	33.83	34.68	34.84	40.06	40.10
1932-33	39.50	39.44	38.64	35.94	37.68	41.09	40.86	39.71	37.04	39.88	39.75	39.46	38.82
1933-34	37.88	42.47	40.39	46.39	42.83	41.97	40.81	42.14	42.07	47.44	57.00	55.00	42.72
1934-35	53.66	50.81	46.44	42.82	41.83	41.19	46.59	48.00	46.46	49.59	50.53	49.71	45.64
1935-36	47.37	47.07	44.46	42.40	38.47	40.91	45.76	44.92	43.96	45.19	44.44	39.31	43.56
1936-37	37.43	36.26	35.86	36.44	38.73	37.19	36.33	38.25	41.59	43.13	41.84	39.01	37.48
1937-38	35.97	35.83	34.07	33.44	31.94	29.93	27.28	26.92	26.14	28.18	26.47	25.42	31.36
1938-39	23.18	22.69	22.56	23.24	22.53	20.92	22.81	22.32	22.31	24.78	25.56	28.42	22.61
1939-40	24.96	23.93	24.00	24.11	23.72	26.11	27.16	25.72	27.00	30.17	32.91	31.67	25.31
1940-41	28.78	27.65	26.25	26.69[3]	28.69	30.80							

[1] The monthly prices were obtained by averaging the Wednesday and Saturday closing prices. The season average price was obtained by multiplying each monthly price by the combined reported receipts during that month at Savannah, Jacksonville, and Pensacola and dividing the total of these figures for the season by the total receipts for that season, thereby giving the months of heavy receipts and of low receipts their proper relative value.

[2] Wednesdays and Fridays closing Savannah prices used for December, January and February for 1936-37, and 1937-38. Fridays prices used for 1938-39, 1939-40 and 1940-41 when there was no quoted Saturday market.

[3] To complete the table, beginning July 1, 1940, we have added 6 cents per gallon to the Savannah prices.

Sources of data: Prices, Florida inspections and monthly receipts at Savannah, Jacksonville and Pensacola are taken from the Naval Stores Review and Journal of Trade, Daily Market Reports of the Savannah Exchange, Jacksonville and Pensacola Chambers of Commerce. Economic Analysis Unit, General Crops Section, Agricultural Adjustment Administration.

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Naval Stores, Apr. - Sept., 1940

Production, Consumption, Exports, Imports, Prices—p. 14

The data on production, consumption and stocks are expressed in commercial units: For turpentine—barrels of 50 gage gallons; and for rosin—barrels of approximately 500 pounds gross weight. Carryover (stocks) figures do not include gum and wood turpentines producible from crude gum and crude steam distilled or destructively distilled wood turpentine on hand.

Statistics on foreign production, stocks and exports have been omitted from this issue due to lack of complete and accurate data.

These reports are designed to be of use to the industry—producer, factor, distributor and consumer. Every effort is made to obtain complete and accurate information but the responsibility for completeness, accuracy and promptness of issue depends upon the cooperation of those reporting. In studying the data given in this, as well as in the previous reports, it should be borne in mind that the Bureau of Agricultural Chemistry and Engineering merely assembles the figures from the individual reports received.

For comparison with earlier periods refer to Statistical and Technical Data Section, p. 113, July, 1937; p. 119, January, 1938; p. 697, December, 1938; p. 623, November, 1939; p. 767, December, 1939; p. 119, January, 1940; p. 223, August, 1940, and p. 621, November, 1940.

United States Exports of Rosin

(By naval stores seasons, beginning April 1 and ending the following March 31)

Total Exports of Rosin[1]

(Bbls.—500 lbs. gross)

Destination	1940-41 Apr.-Sept. 6 mos.	1939-40 Apr.-Sept. 6 mos.	1939-40 Apr.-Mar. 12 mos.
United Kingdom	98,207	114,914	291,481
Germany and N. Europe	8,132	140,201	224,233
Italy and S. Europe	12,077	2,929	30,464
Argentine	17,970	24,247	55,302
Brazil	26,734	38,258	72,372
Other South America	16,646	22,160	42,772
Japan	26,741	24,506	43,841
Australia and New Zealand	23,534	14,614	44,486
Netherlands East Indies	9,484	18,344	33,729
Canada	32,877	27,749	61,902
All other Exports	33,387	39,832	75,298
Total	305,789	467,754	975,880

Exports of Gum Rosin

Destination	1940-41 Apr.-Sept. 6 mos.	1939-40 Apr.-Sept. 6 mos.	1939-40 Apr.-Mar. 12 mos.
United Kingdom	56,942	75,077	179,792
Germany and N. Europe	7,178	86,487	134,287
Italy and S. Europe	9,887	1,703	17,938
Argentine	11,546	15,748	32,260
Brazil	4,434	9,477	18,662
Other South America	7,323	12,540	25,061
Japan	18,175	19,221	35,476
Australia and New Zealand	14,695	11,403	34,827
Netherlands East Indies	5,385	9,893	16,068
Canada	18,935	19,549	42,676
All other Exports	20,610	28,512	51,798
Total	175,110	289,610	588,845

Exports of Wood Rosin[1]

Destination	1940-41 Apr.-Sept. 6 mos.	1939-40 Apr.-Sept. 6 mos.	1939-40 Apr.-Mar. 12 mos.
United Kingdom	41,265	39,837	111,689
Germany and N. Europe	954	53,714	89,946
Italy and S. Europe	2,190	1,226	12,526
Argentine	6,424	8,499	23,042
Brazil	22,300	28,781	53,710
Other South America	9,323	9,620	17,711
Japan	8,566	5,285	8,365
Australia and New Zealand	8,839	3,211	9,659
Netherlands East Indies	4,099	8,451	17,661
Canada	13,942	8,200	19,226
All other Exports	12,777	11,320	23,500
Total	130,679	178,144	387,035

[1] Includes product commonly referred to as "B Wood Rosin." Reported exports "sulfate wood rosin" including lignin liquor for Apr.-Sept. 1940, 4,272 tons. Estimated one-half of this was not "sulfate wood rosin." (Source of information—Bureau of Foreign and Domestic Commerce.)

Weighted Average Monthly and Season Prices of Gum Rosin (280 lb. bbls.)—1921-22 to 1940-41[1]

(Based upon Wednesdays and Saturdays closing Savannah Prices)[2]

In dollars per barrel of 280 pounds gross weight

Season	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Average
1921-22	4.00	4.42	3.87	3.78	4.00	4.39	4.34	4.42	4.47	4.21	4.22	4.10	4.20
1922-23	4.35	4.79	5.09	5.23	5.25	5.52	5.75	5.48	5.14	5.07	5.15	5.17	5.20
1923-24	4.96	4.88	4.82	4.78	4.66	4.62	4.57	4.44	4.80	4.88	4.69	4.74	4.67
1924-25	4.81	4.88	4.72	4.71	4.94	5.20	5.99	6.46	6.49	7.19	7.28	7.24	5.61
1925-26	7.52	9.01	8.78	9.15	10.22	13.02	14.33	14.22	13.05	12.09	13.34	12.66	11.11
1926-27	11.66	10.42	12.18	13.09	12.53	13.92	12.32	11.64	11.64	11.98	11.98	10.42	12.20
1927-28	9.77	9.11	8.46	8.32	8.96	8.47	7.64	6.87	7.64	8.61	8.38	8.58	8.35
1928-29	8.31	7.68	8.24	8.53	8.32	8.06	8.20	8.53	8.57	8.57	8.36	8.08	8.29
1929-30	7.50	7.39	7.31	7.49	7.44	7.87	8.16	7.62	7.34	7.48	7.45	7.22	7.54
1930-31	6.85	6.16	5.65	4.78	4.42	4.77	4.37	4.45	4.46	4.30	4.52	4.95	5.02
1931-32	4.96	5.01	5.26	3.95	3.12	3.04	2.95	3.27	3.10	3.10	3.18	3.67	3.89
1932-33	2.98	2.91	2.74	2.54	2.32	3.23	3.07	2.94	2.92	2.98	2.90	2.90	2.83
1933-34	2.95	3.54	3.53	4.09	3.83	3.91	3.86	3.92	3.90	4.24	5.04	5.06	3.88
1934-35	5.09	4.87	4.55	4.30	4.37	4.43	4.52	4.45	4.48	4.73	4.86	4.79	4.55
1935-36	4.67	4.72	4.58	4.44	4.12	4.38	4.81	4.71	4.55	4.60	4.57	4.60	4.54
1936-37	4.38	4.32	4.70	5.42	6.68	6.00	6.23	7.26	9.28	10.20	9.76	8.97	6.42
1937-38	8.07	8.30	8.15	8.00	7.98	8.03	7.35	6.21	5.55	5.92	5.38	4.73	7.35
1938-39	4.87	4.67	4.81	5.15	4.98	4.72	5.28	5.64	5.09	5.12	5.29	5.79	5.02
1939-40	5.22	5.19	5.34	5.49	5.34	5.66	5.73	5.54	5,39	5.54	5.51	5.59	5.44
1940-41	5.20	5.06	4.69	4.00	4.46	4.21							

Note: Rosin Grades included in average prices follow—X, WW, WG, N, M, K, I, H, G, F, E, D, B.

[1] The monthly prices were obtained by multiplying the average of the Wednesday and Saturday prices of each grade by the number of barrels of each grade reported as inspected in Florida during that month, and dividing the total of the resulting figures by the total number of barrels inspected in Florida during that month, thereby giving the proper relative value to each grade. The season average price was obtained by multiplying each monthly price by the combined reported receipts during that month at Savannah, Jacksonville and Pensacola and dividing the total of these figures for the season by the total receipts for the season, thereby giving the months of heavy receipts and of low receipts their proper relative value.

[2] Wednesdays and Fridays closing Savannah prices used for December, January and February for 1936-37, and 1937-38. Fridays prices used for 1938-39, 1939-40 and 1940-41 when there was no quoted Saturday market.

Sources of data: Prices, Florida inspections and monthly receipts at Savannah, Jacksonville and Pensacola are taken from the Naval Stores Review and Journal of Trade, Daily Market Reports of the Savannah Exchange, Jacksonville and Pensacola Chambers of Commerce. Economic Analysis Unit, General Crops Section, Agricultural Adjustment Administration.

New Trade Marks of the Month

REMOLGAN
429,044

PROPERT'S SHOE CREAM
435,031

PAINTITE
436,488

KILFROST
400,309

EZYM
409,942

HEALTH-GARD PROCESS
The Modern Scientific Approved Scientific Standard of Sanitation Service
416,501

RUST-FOE
436,661

GOLD CROWN
438,192

LYONSET
431,817

(Q.A.)
436,931

Miracle-Mend
436,961

ALEMITE
437,634

LEXOPRIN
437,686

NAMAQUIN
438,383

NATOPHEROL
438,427

POLYZYME
438,652

AURIDIN
438,533

FORTRON
438,616

NYAMINE
438,444

BEXEL
437,460

VALTIVA
438,527

Stet
438,541

ANTHRASOL
438,569

Rx
438,599

CELAMERICA
438,118

CELATWILL
438,119

CELAWAVE
438,120

SANTOLOID
437,628

GLOSSBATH
433,803

Kleer-Flex
438,260

DRYORTH
438,294

DYECOL
417,000

DUSTALL
429,626

Lucitone
431,446

KLORSEPTIC
431,807

ORBALGIN
433,792

VAFLOL
438,604

GLUJEL
438,577

Textart
438,677

VEGOL
438,793

Naturolagar
438,823

MOTOSOL
438,870

Colortrim
438,922

SEDULON
438,945

SYNKAVITE
438,946

F-R 19
438,980

Trade Mark Descriptions†

429,044. General Dyestuff Corp., New York City; Feb. 29, 1940; for leather softener; since Feb. 7, 1940.
435,031. Salomon & Phillips, New York City; August 15, 1940; for shoe, boot, and other leather polishes; since 1895.
436,488. Turco Products, Inc., Los Angeles, Calif.; Sept. 28, 1940; for cleaning compounds; since Mar. 18, 1938.
400,309. Kilfrost Mfg. Co., Ltd., London, Eng.; Nov. 30, 1937; for defrosting paste; since Dec. 9, 1936.
409,942. Rosie Breen Smith as Irvin & Rose, New Orleans, La.; Aug. 24, 1938; for treatment of skin irritations; since July 2, 1936.
416,501. Joseph I. Blanck (Health-Gard Process Co.), Brooklyn, N. Y.; Feb. 28, 1939; for liquid germicidal, bactericidal, fungicidal, antiseptic and disinfectant compound; since Jan. 1, 1939.
436,661. Rust-Foe, Inc., New York City; Oct. 4, 1940; for rust removing, rust preventing and metal cleaning preparations; since March, 1939.
438,192. Harry E. Brewin & Sons, Inc., Pleasantville, N. J.; Nov. 25, 1940; for arterial fluid for embalming purposes; since Aug. 25, 1940.
431,817. Lyonset Limited, New York City; May 11, 1940; for textile chemicals; since Sept. 1, 1939.
436,931. B. Heller & Co., Chicago, Ill.; Oct. 14, 1940; for chemical preparation for use in curing meat; since Sept. 26, 1940.
436,961. Benjamin D'Agostino (D'Agostino Labs), Los Angeles, Calif.; Oct. 15, 1940; for liquid preparation for mending broken or cracked finger nails; since May 11, 1940.
437,634. Stewart-Warner Corp., Chicago, Ill.; Nov. 6, 1940; for liquid flushing compound for internal combustion engines; since Sept. 26, 1940.
437,686. Eli Lilly & Co., Indianapolis, Ind.: Nov. 8, 1940; for liver concentrate preparation; since Oct. 21, 1940.
438,383. Endo Products, Inc., New York City; Nov. 30, 1940; for preparation of vitamin K suitable for parenteral or oral administration; since Nov. 15, 1940.
438,427. Abbott Laboratories, North Chicago, Ill.; Dec. 2, 1940; for vitamin preparation; since Nov. 20, 1940.
438,652. The Harrower Laboratory, Inc., Glendale, Calif.; Dec. 9, 1940; for compound digestant formula; since Oct. 29, 1940.
438,533. The Doho Chemical Corp., New York City; Dec. 5, 1940; for chemical compound unfolding a muccous dissolving an antiseptic action; since Oct. 1, 1940.
438,616. Freeda Agar Products, New York City; Dec. 7, 1940; for vitamin capsules or tablets; since May 1, 1940.
438,444. Nyanza Color & Chemical Co., Inc., New York City; Dec. 2, 1940; for chemicals used in the dyeing and finishing and processing of textiles, leather, fur, paper, etc.; since October, 1938.
437,460. Wm. J. Wardall, trustee of Estate of McKesson & Robbins, Inc., New York City; Dec. 2, 1940; for vitamin B. Complex Preparation; since November, 1938.
438,527. Boyle & Co., Los Angeles, Calif.; Dec. 5, 1940; for malt compound containing livĕr extract, yeast, and vitamins; since Aug. 31, 1940.
438,541. The B. F. Goodrich Co., New York City and Akron, Ohio; Dec. 5, 1940; for water soluble liquid to be added to the water of cooling systems to prevent freezing thereof; since Sept. 24, 1940.
438,569. General Dyestuff Corp., New York City; Dec. 6, 1940; for dyestuffs; since Nov. 15, 1940.
438,599. Warner-Patterson Co., Chicago, Ill.; Dec. 6, 1940; for liquid solder for stopping leaks in automobile cooling systems; since Nov. 27, 1940.
438,118. Celanese Corp. of America, New York City; Nov. 22, 1940; for piece goods made wholly or partially of cellulose derivatives; since Nov. 19, 1940.
438,119. Celanese Corporation of America, New York City; Nov. 22, 1940; for piece goods made wholly or partially of cellulose derivatives; since August, 1940.
438,120. Celanese Corporation of America, New York City; Nov. 22, 1940; for piece goods made wholly or partially of cellulose derivatives; since Sept. 30, 1940.
437,628. Monsanto Chemical Co., St. Louis, Mo.; Nov. 6, 1940; for artificial plastic materials of cellulose esters and the like in the form of sheets, rods, tubes, plates, and preforms; since Oct. 31, 1940.
433,803. Turco Products, Inc., Los Angeles, Calif.; July 9, 1940; for cleaning compounds; since Feb. 8, 1940.
438,260. Beacon Chemical Co., Philadelphia, Pa.; Nov. 27, 1940; for glass cleaner; since Nov. 13, 1940.
438,294. The Cowles Detergent Co., Cleveland, Ohio; Nov. 27, 1940; for detergent compound; since Oct. 29, 1940.
417,000. Robert W. Cooke (Cooke Lab. Products), Sepulveda, Calif.; Mar. 13, 1939; for dye treatment for the drinking water for poultry used as an expectorant medicine for poultry; since Feb. 1, 1938.
429,626. Seacoast Laboratories, Inc., New York City; Mar. 15, 1940; for insecticide dust; since April 1, 1935.
431,446. E. I. du Pont de Nemours & Co., Wilmington, Del.; May 1, 1940; for methyl methacrylate monomer and methyl methacrylate polymer; since Mar. 1, 1940.
431,807. Howard D. Day (High Chemical Co.), Philadelphia, Pa.; May 11, 1940; for oil and ointment; since 1925.
433,792. Orbis Products Corp., New York City; July 9, 1940; for emulsifier for oils and tars; since June 14, 1940.
438,604. George A. Breon & Co., Inc., Kansas City, Mo.; Dec. 7, 1940; for capsules for fish liver oil; since Sept. 20, 1940.
438,577. Howard D. Meincke, Chicago, Ill.; Dec. 6, 1940; for chemically treated starch; since Oct. 25, 1940.
438,677. Aridye Corp., Fair Lawn, N. J.; Dec. 10, 1940; for textile printing pasters, textile colors, and extenders and thinners for such pastes and colors; since Oct. 24, 1940.
438,793. Distillation Products, Inc., Rochester, N. Y.; Dec. 13, 1940; for pharmaceutical preparation, more particularly vitamin E. Concentrate; since Nov. 29, 1940.
438,823. Wilco Drug, Inc., Brooklyn, N. Y.; Dec. 13, 1940; for laxative of mineral oil and agar; since 1918.
438,870. Elmer M. DePencier, as Permorite Products Co., Los Angeles, Calif.; Dec. 16, 1940; for solvent fluid; since Sept., 1937.
438,922. Clark Sloan Co., Shawnee, Okla.; Dec. 17, 1940; for specially prepared liquid substance for use in reconditioning fabrics; since Feb. 1, 1940.
* **438,945.** Hoffmann-La Roche, Inc., Nutley, N. J.; Dec. 17, 1940; for medicinal preparation for use as a sedative; since Oct. 7, 1940.

† Trademarks reproduced and described include those appearing in Official Gazette of the U. S. Patent Office, January 21 to February 18, 1941.

New Trade Marks of the Month

PLIOSHEEN
437,062

57 Alundum
438,277

TOP NOTCH
438,342

IDEAL
434,650

CARBON BLAST
429,968

purg-it
432,151

DEFUZZ
435,966

EHRLICH'S 303
436,464

B. C. N.
436,649

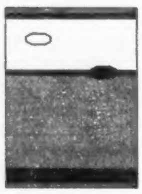
PANATOL
437,887

THROMBOQUIN
437,916

SPOR-GO
437,943

PENDARVON
437,954

WONDER SOLV
438,080



438,716

'AVIMAL'
439,070

NEOROBIN
439,086

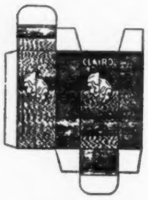
RONONE
439,087

SENITEX
438,467

R BROWN
435,640

ELANESE
438,266

CORTILLA
434,522



425,640

PROPEDRIN
429,921

FLOROZONE FRAGRANT DISINFECTANT
436,414

EASTONE
437,536

THYLOHYDROQUINONE
438,251

THIALKENE
438,378

ORBA
438,402

CHEMWAX
438,440

Casyllium
438,459

NAFTEX
438,950

IVC LICOVITE
439,275

NICOIL
439,339

Keyspray
439,346

THIURIDE
439,326

D Z R
430,311

LANESE
435,679

WONDER-KLEEN
422,683

ANO-JEL
433,133

SPAREX
435,898

LOCKEBRITE
437,900

MAINTENOL
438,687

PANCO
439,032

438,946. Hoffmann-La Roche, Inc., Nutley, N. J.; Dec. 17, 1940; for synthetic vitamin-K like substance; since Mar. 7, 1940.

438,980. Fink-Roselieve Co., Inc., New York City; Dec. 18, 1940; for photographic preparations and photographic chemicals; since Dec. 1, 1940.

437,062. The Goodyear Tire & Rubber Co., Akron, Ohio; Oct. 18, 1940; for waterproof fabrics containing no rubber of any kind; since Aug. 29, 1940.

438,277. Norton Co., Worcester, Mass.; Nov. 27, 1940; for abrasive products; since Nov. 12, 1940.

438,342. Ed. G. W. Dropp (Top Notch Products Co.), St. Louis, Mo.; Nov. 29, 1940; for cleaner for cleaning wallpaper, tapestry, leather goods, window shades, upholstery and kindred articles; since Sept. 12, 1940.

434,650. The Ideal Paste & Chemical Co., Cleveland, Ohio; Aug. 3, 1940; for paste; since May 13, 1940.

429,968. Ed. T. Barron, Minneapolis, Minn., Mar. 26, 1940; for carbon remover; since Feb. 4, 1939.

432,151. Pennant Oil & Grease Co., Los Angeles, Calif.; May 20, 1940; for motor cleanser and solvent for gums and varnishes; since Mar. 15, 1940.

435,966. Carter Products, Inc., New York City; Sept. 14, 1940; for cream depilatory; since Sept. 3, 1940.

436,464. Julius C. Ehrlich, Reading, Pa.; Sept. 28, 1940; for insecticides, germicides, and disinfectants; since September, 1936.

436,649. Haack Bros., Manufacturing Pharmacist, Portland, Ore.; Oct. 4, 1940; for tablets containing thiamine hydrochloride (vitamin B.1 synthetic), cevitamic acid (crystalline synthetic vitamin C.), and nicotinic acid; since Sept. 9, 1939.

437,887. Surrey Laboratories, New York City; Nov. 14, 1940; for pharmaceutical preparation having deodorant, astringent, and antiseptic properties; since Sept. 1, 1940.

437,916. Schering & Glatz, Inc., New York City; Nov. 15, 1940; for substance to be used in bringing about blood coagulation; since Nov. 2, 1940.

437,943. General Chemical Co., New York City; Nov. 16, 1940; for fungicide for use on vegetation; since Oct. 16, 1940.

437,954. Nutrition Research Laboratories, Chicago, Ill.; Nov. 16, 1940; for natural vitamin B Complex; since Nov. 4, 1940.

438,080. Miller Manufacturing Co., Camden, N. J.; Nov. 20, 1940; for chemicals, for removing rust and corrosion; since Mar. 30, 1934.

438,716. Abbott Laboratories, North Chicago, Ill.; Dec. 11, 1940; for various chemicals, drugs, pharmaceuticals, etc.; since May 13, 1931.

439,070. Burroughs Wellcome & Co. Inc., New York City; Dec. 21, 1940; for polyvitamin preparation; since Dec. 12, '40.

439,086. Abbott Laboratories, North Chicago, Ill.; Dec. 23, 1940; for medicinal compound for treatment of skin disorders; since Mar. 1, 1919.

439,087. Abbott Laboratories, North Chicago, Ill.; Dec. 23, 1940; for medicinal compound used in the treatment of certain skin disorders; since Dec. 13, 1940.

438,467. Binney & Smith Company, New York City; Dec. 3, 1940; for carbon black for use in the rubber industry; since Nov. 19, 1940.

435,640. Brown Rubber Co., Inc., La Fayette, Ind.; Sept. 4, 1940; for sponge rubber in sheet and strip form; since Aug. 14, 1940.

438,266. Celanese Corp. of America, New York City; Nov. 27, 1940; for staple fibers made wholly or partially of cellulose derivatives; since Nov. 25, 1940.

434,522. The Davies-Young Soap Co., Dayton, O.; July 31, 1940; for soap base and bar soap; since Mar. 14, 1928.

425,640. Clairol, Inc., New York City; Nov. 15, 1939; for hair dye, hair tint, hair wash, shampoo and hair dye remover; since March, 1935.

429,921. Sharp & Dohme, Inc., Philadelphia, Pa.; Mar. 23, 1940; for chemicals and pharmaceuticals; since Mar. 20, 1940.

436,414. Roland G. Beneville (Florozone Company), Brooklyn, N. Y.; Sept. 27, 1940; for aromatic disinfectants, germicide and deodorizer; since 1902.

437,536. Tennessee Eastman Corporation, Kingsport, Tenn.; Nov. 2, 1940; for dyes for use with rayon; since July 13, 1940.

438,251. E. R. Squibb & Sons, New York City; Nov. 26, 1940; for anti-hemorrhagic preparations; since Nov. 13, 1940.

438,378. Continental Oil Company, Ponca City, Okla.; Nov. 30, 1940; for sulfur-bearing oxidation inhibitor; since Nov. 9, 1940.

438,402. Orba Sales Company, New Philadelphia, O.; Nov. 30, 1940; for new drug designed for use as a laxative; since Nov. 19, 1940.

438,440. Ralph N. Jones (Chemical Processing Co.), Charlotte, N. C.; Dec. 2, 1940; for cotton softeners; since June 22, 1940.

438,459. The Upjohn Company, Kalamazoo, Mich.; Dec. 2, 1940; for medicinal preparation to be used as a laxative; since Sept. 24, 1940.

438,950. J. Leon Lascoff & Son, New York City; Dec. 17, 1940; for saponaceous mixture, used as an antiseptic ingredient of preparations for treatment of skin diseases; since Nov. 15, 1940.

439,275. International Vitamin Corp., New York City; Dec. 30, 1940; for vitamin product; since Sept. 21, 1939.

439,339. General Chemical Company, New York City; Jan. 2, 1941; for insecticidal oil spray for use on vegetation; since Dec. 3, 1940.

439,346. Keystone Chemical Company, Inc., Cleveland, O.; Jan. 2, 1941; for insecticide moth spray; since June, 1924.

439,326. Abbott Laboratories, North Chicago, Ill.; Jan. 2, 1941; for veterinary preparations for treatment of mange; since Dec. 24, 1940.

430,311. Deutscher Zellwoll-Ring E. V., Berlin, Germany; Apr. 3, 1940; for textile fibers; since Nov. 1, 1938.

435,679. Celanese Corp. of America, New York City; Sept. 5, 1940; for staple fibers made wholly or partially of cellulose derivatives; since Sept. 3, 1940.

422,683. Vera P. Williams (The C. I. Togstad Company), Kokomo, Ind.; Aug. 16, 1939; for chemical cleaning preparation; since Aug. 1, 1939.

433,133. Max H. Thurnauer (The An-Our Co.), Cincinnati, O.; June 18, 1940; for cleaner; since Aug. 17, 1938.

435,898. Fisher Products Corp., Washington, D. C.; Sept. 12, 1940; for cleaning material; since June 5, 1940.

437,900. Locke Insulator Corp., Baltimore, Md.; Nov. 15, 1940; for cleaning material; since Apr. 1, 1940.

438,687. The Davies-Young Soap Co., Dayton, O.; Dec. 10, 1940; for cleaning compound; since Sept. 3, 1939.

439,032. Thomas D. Sullivan, Washington, D. C.; Dec. 19, 1940; for cleaner; since Dec. 16, 1940.

U. S. Chemical Patents

Off. Gaz.—Vol. 522, No. 4—Vol. 523, Nos. 1, 2, 3—p. 246

A Complete Check—List of Products, Chemicals, Process Industries

Agricultural Chemicals

An additive for fertilizer comprising finely divided fibrous organic material having incorporated therein a plant growth selected from group consisting of indolebutyric and naphthaleneacetic acids and their homologues, and the methyl and ethyl esters and the potassium, sodium, calcium, barium, strontium and ammonium salts thereof, said plant growth substance being in proportion of more than 120 milligrams to ton of additive. No. 2,229,948. Lionel Weil to H. Weil & Bros.

Process for production of phosphate fertilizers by melting together phosphate rock with soda slag obtained by treating pig iron with soda ash and soda containing mixtures in a rotary furnace, consisting in melting the charge on a lining made by stamping a mixture of calcined dolomite with tar. No. 2,230,539. Otto Johannsen and Karl-Heinz Hennenberger to Rochling'sche Eisen.

Method of granulating superphosphate. No. 2,232,145. Mark Schoeld to the Davison Chemical Corp.

Cellulose

Method treating films obtained from high molecular weight film-forming cellulose esters to render same non-curling. No. 2,229,741. Gerhard Hinz to Sherka Chemical Co., Inc.

Process of producing wood cellulose. No. 2,230,119. Fredrich Olsen, Lionel Goff and Lyle McSheldon to The Cellulose Research Corp.

Production of purified cellulose esters. No. 2,230,387. George Schneider to Celanese Corp. of America.

Method of cleaning and bleaching artificial fibers spun from a cellulose solution prepared from cellulose raw materials containing lignin. No. 2,230,957. Helmuth Korte and Erich Kayser and Erich Schwartz to I. G. Farbenindustrie Aktiengesellschaft.

Plasticized organic solvent soluble cellulosic film. No. 2,230,967. Wm. D. R. Straughn to E. I. du Pont de Nemours & Co.

Method of treating cellulosic material. No. 2,231,927. Leon Lilienfeld.

Method producing molded product of cellulosic material from group consisting of sulfite, soda and kraft pulp and comminuted wood, said cellulosic material being insoluble in terpin hydrate at or above its M.P. of 115° C., which comprises treating said material with terpin hydrate at or above 115° C. and subjecting resultant to heat and pressure in suitable mold. No. 2,231,928. Christopher Luckhaupt.

Process for production bleached separated fibres from relatively soft raw materials such as esparto grass, jute, hemp, linseed straw, coconut fiber, bamboo and soya bean stalks. No. 2,231,953. Charles Ruzicka to Celec Corp., Ltd.

Chemical Specialty

Method making rubber-bonded abrasive articles. Nos. 2,229,879-880. Hugh V. Allison to The Allison Co.

Method of preparing coffee and product thereof. No. 2,230,031. George A. Fisher to William S. Scull Co.

Liquid lip rouge preparation. No. 2,230,063. Milton Klimist to M. Martin Gordon.

Astrigent preparations. Nos. 2,230,083 and 2,230,084. Jules B. Montenier.

Method of obtaining microbian enzymes. No. 2,230,130. Herbert Bucherer.

Etching solution for lithographing plates consisting of about one volume of 37% aqueous Hcl and three volumes of propylene glycol. No. 2,230,156. Everett F. Carman to Interchemical Corp.

Process of connecting a metal body to a vitreous ceramic body. No. 2,230,205. Davidge H. Rowland and Carl D. Croskey to Locke Insulator Corp.

Process and apparatus for saturating fruit juices and other liquids with gas. No. 2,230,210 Otto Brecour and Friedrich Kranz to The De Laval Separator Co.

Ground wheat flour consisting of admixture of germ and endosperm portions of wheat grains and with the oil extracted from the germ porton previous to admixing. No. 2,230,417. Frank G. Wellinghoff.

A safety igniting composition which comprises a mixture of binding agent, a friction-producing agent and a semi-pyrophoric iron oxide. No. 2,230,629. Alfred Schmid to Oswald Fidel Wyss.

Stable waterproofing composition. No. 2,230,656. Adolph Scholler to Scholler Bros., Inc.

Salt treatment of cereal grits. No. 2,230,672. Hugh E. Allen to Albert G. McCaleb.

A casing comprising a paper free from resin impregnated with a solution of gelatine and casein and subjected to hardening. No. 2,230,697. George Prytikin.

Odor absorbing composition comprising mass of cellulosic fibers individually coated with dehydrated silica gel, said coated fibers being substantially separated and forming loosely coherent absorptive mass. No. 2,230,903. Aeno Ostenberg.

Foundry binder comprising bentonite and a non-swelling montmorillonite clay. No. 2,230,939. Norman J. Dunbeck to Peerpatco, Inc.

A single solution silver halide developing and fixing bath comprising a silver halide developing mixture, an amino benzoate and a silver halide fixing agent. No. 2,230,977. Garnet P. Ham to American Cyanamid Co.

Larvicide and insecticide and method of production thereof. No. 2,230,995. Reissue. Narayan Annappa Balvalli ½ to F. S. Kerr & Co.

Calcium oxide-chromium oxide refractory. No. 2,231,024. Gordon R. Pole.

Conditioning lithographic plate by applying thereto solution containing about one-half to two ounces of a 10% solution of a water-soluble chromium phosphate and about one to four ounces of a 14°Be. gum arabic solution per gallon of water. No. 2,231,045. William H. Wood to Harris-Seybold-Potter Co.

A cementitious composition. No. 2,231,123. Dean S. Hubbell to H. H. Robertson Co.

Stabilization of photographic emulsions. No. 2,231,127. John D. Kendall to Ilford, Ltd.

A soluble oil comprising petroleum oil, rosin soap, naphthenate soap, unsaponified rosin and naphthenic acids, sulfonated castor oil, diethylene glycol monobutyl ether, and water. No. 2,231,214. Roy F. Nelson and Theodore W. Langer to The Texas Co.

Process for purifying and refining Irish moss gum. Nos. 2,231,283-284. Norman Blihovde, to Jacques Wolf & Co.

Ammonium polysulfide solution for use as insecticide. No. 2,231,423. Franz A. Horsley and Ludwig Rosenstein to Shell Development Co.

Confection of the gum-drop type containing acid hydrolyzed, thin boiling cornstarch of substantially 60 fluidity, the Scott of which is about 70. No. 2,231,476. Harry Meisel to Corn Products Refining Co.

Waterproofing composition. No. 2,231,486. Arthur F. Taggart.

Stable liquid fuel having coal particles equally distributed throughout a fuel oil. No. 2,231,513. Albert L. Stillman to Fuel Research Corp.

Manufacture of alkali-resistant plywood. No. 2,231,562. John D. Carter to Philadelphia Quartz Co.

Photographic emulsion. No. 2,231,658. Leslie G. S. Brooker and Lloyd A. Smith to Eastman Kodak Co.

Process for preserving food. No. 2,231,791. Duryea Bensel to Bensel-Brice Corp.

Nonhygroscopic sugar product. No. 2,231,835. James F. Walsh and Abraham H. Goodman to American Maize-Products Co.

Process of manufacturing albumin-like substance from protein-rich vegetable material. No. 2,232,052. Earl H. Cummins to The Curtiss Candy Co.

Foaming composition yielding with water and gases a stable foam for extinguishing burning hydrophilic liquids. No. 2,232,053. Karl Daimler and Max Paquin to General Aniline & Film Corp.

Process of producing an alkali-metal silicate-clay adhesive. No. 2,232,162. Ernest R. Boller to E. I. du Pont de Nemours & Co.

Abrasive composition and method of producing same. No. 2,232,389. Gerhard Jurkat.

In processing corn, the steeping of corn in an aqueous liquor having a temperature of between 120° F. and 150°F. at a pH of between 4 and 7 for about 3 to 18 hours. No. 2,232,555. Sidney Musher to Musher Foundation, Inc.

Hydraulic fluid characterized by relatively complete inertness in contact with metallic and rubber parts. No. 2,232,581. John C. Woodhouse and Arthur G. Weber to E. I. du Pont de Nemours & Co.

Process manufacturing cellular building unit from inorganic set-hardenable plastic composition, gas entraining agent, and substantially water-insoluble volatile liquid. No. 2,232,588. Thomas P. Camp to U. S. Gypsum Co.

Coal Tar Chemicals

Lower monobasic monocarboxylic acid ester of an N-monomethylolamide of a higher monobasic nomocarboxylic acid. No. 2,232,485. Joseph H. Shipp to E. I. du Pont de Nemours & Co.

Amino-hydroxy arseno-benzene. No. 2,232,659. Alfred Fehrle and Walter Herrmann, Paul Fritzsche and Hans Hilmer to Winthrop Chemical Co., Inc.

Compound from group consisting of acid sulfuric acid ester of methyl heptadecenyl carbinol and water soluble salt of said ester. No. 2,229,649. Fritz Guenther, Hans Haussmann, Joseph Huesslein, Herman Schuette, and Conrad Schoeller to General Aniline & Film Corp.

P.-aminobenzyl acyl amines, their quaternary derivatives, and their manufacture. No. 2,229,803. Kurt Engel and Kurt Pfaechler to J. R. Geigy A.G.

Method of preparing alpha hydroxy carboxylic acids. No. 2,229,879. Vartkes Migrdichian to American Cyanamid Co.

Disulfonium compounds of high molecluar weight. No. 2,230,587. August Chwala and Edmund Waldmann to General Aniline & Film Corp.

Aliphatic aldehyde condensation products and a process for making them. No. 2,230,591. Franz G. Fischer and Alois Waibel to General Aniline & Film Corp.

Manufacture of 2-hydroxynaphthalene-4-sulfonic acid and substitution products thereof. No. 2,230,791. Walther Benade, Kreis Bitterfield, Werner Keller and Kurt Berger to General Aniline & Film Corp.

Carbonic acid ester of 1,2 di-(parahydroxyphenyl), 1,2-diethyl ethylene. No. 2,231,936. Heinrich Medick to Winthrop Chem. Co., Inc.

Process of recovering high-molecular aliphatic carboxylic acids from their salts. No. 2,232,331. Wolfgang Leithe and Martin Luther to Jasco, Inc.

Coatings

Process making pigmented coating compositions. No. 2,232,426. Willard R. Barrett to E. I. du Pont de Nemours & Co.

Process for the production of coating preparations which comprises admixing water and solution of rubber compound in a solvent therefore which is immiscible with water, in presence of emulsifying agent. No. 2,229,882. Josef Binapfl, Eugene Rock, Friedrich Frick and Otto Jordan to I. G. Farbenindustrie Aktiengesellschaft.

Process for the production of cement coatings on walls and the like. No. 2,230,519. Anton Weithaler, deceased, by Antoine Knoll.

Method protectively coating a web having a printed or inked surface, which includes first applying solution of vinyl acetate resin to close surface pores and which remains plastic and tacky and draws the ink or color from the web into itself, and thereafter applying second coating or solution of cellulose acetate which quickly dries to hard and glossy finish and which also draws the ink or color into itself. No. 2,230,876. M. Earl Wysong to The Fred Goat Co., Inc.

Coating of articles of aluminum or aluminum alloys. No. 2,231,373. Max Schenk to the Ematal Electrochemical Corp.

Paper coating mixture comprising casein, a casein solvent, formaldehyde, clay, "gamma gypsum," and water. No. 2,231,902. James S. Offutt and Joseph W. Gill to United States Gypsum Co.

Dyes, Stains, Etc.

Process and preparation for the manufacture of azo dyestuffs. Nos. 2,232,405 and 2,232,406. Albert Schmelzer to General Aniline & Film Corp.

Dyeing union fabrics containing polyvinyl halide-acetate copolymers. No. 2,232,460. Arthur F. Klein to American Cyanamid Co.

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Dispersed dyestuff powder. No. 2,232,470. Frederick E. Petke to American Cyanamid Co.
Green sulfur dyes and process for manufacturing the same. No. 2,229,650. Walter Hagge and Herbert Bach to General Aniline & Film Corp.
Diazoamino compounds and method of making. No. 2,229,744. Jean G. Kern to National Aniline & Chemical Co., Inc.
Azo dyes. No. 2,230,099. Frithjof Zwilgmeyer to E. I. du Pont de Nemours & Co.
Cyanine dyes and method for preparation thereof. No. 2,230,257. Edmund B. Middleton and George A. Dawson to Du Pont Film Manufacturing Corp.
Dyestuffs of the anthraquinine series. No. 2,230,574. Walter Mieg and Hans Raab to General Aniline & Film Corp.
Method of preparing azo dyestuffs containing metal. No. 2,230,686. Karl Holzach and Helmut Pfitzner to General Aniline & Film Corp.
Azo dyestuffs. No. 2,230,696. Siegfried Peterson to General Aniline & Film Corp.
Polymethine dyestuffs. No. 2,230,789. Carl Winte and Nikolaus Roh to General Aniline & Film Corp.
Azo compounds and material colored therewith. No. 2,231,021. James G. McNally and Joseph B. Dickey to Eastman Kodak Co.
Vat-dyestuffs of the naphthalimide series and a process of preparing them. No. 2,231,495. Wilhelm Eckert and Otto Braunsdorf to General Aniline & Film Corp.
Process of preparing 4,4'-pyridocyanine dyes. No. 2,231,657. Leslie G. S. Brooker to Eastman Kodak Co.
Polymethine dye intermediates. No. 2,231,659. Leslie G. S. Brooker and Frank L. White to Eastman Kodak Co.
Azo compounds and material colored therewith. Nos. 2,231,705-707. Joseph B. Dickey to Eastman Kodak Co.
Dyestuffs of the naphthophenosafranine series. No. 2,232,067. Carl Hofchen and Eugen Huber to General Aniline & Film Corp.
Azo dyestuffs of the stilbene series. No. 2,232,078. Hans Schindhelm to General Aniline & Film Corp.

Equipment and Apparatus

Apparatus for making chemical substitutions. No. 2,229,679. Games Slayter to Electronic Research Corp. of Ohio.
Combustion apparatus for producing fluid under pressure. No. 2,229,805. Lester S. Graves.
Filter Press. No. 2,229,900. Heinrich Reitz to I. G. Farbenindustrie Aktiengesellschaft.
Wax sweating process and apparatus. No. 2,230,079. Milton E. Hanson and Roy M. Owens to B. F. Sturtevant Co.
Filtering apparatus. No. 2,230,174. Albert Beale.
Methods of distillation. Nos. 2,230,253 and 2,230,254. Jean Loumiet.
Method of apparatus for producing intimate contact between fluids of different densities. No. 2,230,255. Jean Loumiet.
Method of filtering solutions and apparatus therefor. No. 2,230,307. Carl Munch.
Gravity settlement mechanism for separation of solids from liquids. No. 2,230,386. Joseph S. Pecker to American Centrifugal Corp.
Pyrometer apparatus. No. 2,230,438. Erle I. Shobert to Stackpole Carbon Co.
Combined regenerator and catalyst chamber. No. 2,230,467. Henry M. Nelly, Jr. and Hoyt C. Hottel to The M. W. Kellogg Co.
Apparatus for analyzing gaseous mixtures. No. 2,230,593. Gerald L. Hassler to Shell Development Co.
Method for the investigation of substances with the aid of slow neutrons. No. 2,230,618. Hartmut I. Kallmann and Ernst Kuhn to I. G. Farbenindustrie Aktiengesellschaft.
Vertical crystallizer and vacuum pan apparatus. No. 2,230,768. John E. Stuntz.
Pyrometer potentiometer. No. 2,230,779. Manfred J. Johnson to The Lewis Engineering Co.
Filtering device. No. 2,230,883. Ned W. Glass.
System for desiccating a liquid product. No. 2,230,944. Joseph M. Hall.
Rotometer for measuring flow of a fluid. No. 2,230,973. Adelbert K. Fischer to Schutte & Koerting Co.
Process and apparatus for catalytic polymerization operations. No. 2,231,231. Philip Subkow to The Union Oil Co. of Calif.
Apparatus for separating contaminated fluid mixtures. No. 2,231,269. Lawrence A. Holmes.
Colloid Mill. No. 2,231,421. Louis Gitzendanner, to Greenwich Machine & Tool Co., Inc.
Apparatus for treatment of fluids under controlled temperature conditions. No. 2,231,493. Leland W. T. Cummings to Houdry Process Corp.
Apparatus for fractional distillation. No. 2,231,823. Samuel L. Kerr to The United Gas Improvement Co.
Irradiating processes and apparatus. Nos. 2,231,880 and 2,231,871. Walter Baeckler to Union Carbide & Carbon Corp.
Device for the generation of large amounts of negative ions. No. 2,232,030. Hartmut I. Kallmann to I. G. Farbenindustrie Aktiengesellschaft.
Saturator for the manufacture of a coarse crystalline sulfate of ammonia. No. 2,232,115. Heinrich Koppers to Koppers Co.
Electrolysis of alkaline metal chlorides and apparatus therefor. No. 2,232,128. Erich Muller to Th. Goldschmidt Corp.
Furnace for heating hydrocarbon fluids. No. 2,232,136. John Herman Rickerman to Gasoline Products Co., Inc.
An evaporator. No. 2,232,176. Robert G. Guthrie to Chicago By-Products Corp.
Process and apparatus for transferring an emulsifiable fluid from a zone of high pressure to a zone of low pressure. No. 2,232,198. Daniel I. Ashworth to The De Laval Separator Co.
Instrument for measuring human deficiencies of chemicals in the blood. No. 2,232,316. Carleton Deederer.
Condenser section. No. 2,232,320. Alexander M. Georgiev to General Motors Corp.
Froth flotation apparatus. No. 2,232,388. Christopher R. Ingalls, Carl F. Williams and Lawrence L. Mayer to Minerals Separation North American Corp.
Catalyst carrier forming machine. No. 2,232,444. Gustav A. Frenkel to Shell Development Co.
Floating head for shell-and-tube type heat exchangers. No. 2,232,478. Melvin Sack to Henry Vogt Machine Co., Inc.
Machine for spreading of artificial fertilizers. No. 2,232,481. Svend C. E. Schroder to Diderik Overgaard Villemoes.
Method of making a heat exchanger. No. 2,232,562. Ray A. Sandbert to Houdaille-Hershey Corp.
Radiation pyrometer. No. 2,232,594. Paul H. Dike to Leeds & Northrup Co.

Explosives

Method for producing cellular smokeless powder. No. 2,230,100. John H. Aaron and James J. McIntyre to E. I. du Pont de Nemours & Co.
Method producing a progressive burning smokeless powder of high potential energy. No. 2,230,848. Walter P. Regestein to E. I. du Pont de Nemours & Co.
High explosive composition. No. 2,231,043. Clarence H. Winning to E. I. du Pont de Nemours & Co.
Blasting explosive composition. No. 2,231,044. Clarence H. Winning to E. I. du Pont de Nemours & Co.
Propellent powder containing 2% to 10% of an agent selected from the class consisting of phosphorus and its compounds and yielding phosphoric acid on combustion. No. 2,231,946. Ernest R. Rechel and Thomas Stevenson.

Fine Chemicals

P-Nitrobenzene sulfonyl guanidine and process for making it. No. 2,229,784. Philip Stanley Winnek to American Cyanamid Company.
Process for manufacture of unsaturated ketones of the sexual hormone series. No. 2,229,813. Karl Miescher and Albert Wettstein to Ciba Pharmaceutical Products, Inc.
Process for manufacture of derivatives of the cyclopentanopolyhydrophenanthrene series. No. 2,229,818. Tadeus Reichstein and Albert Wettstein to Ciba Pharmaceutical Products, Inc.
Method producing high potency vitamin adsorbate of low bulk. No. 2,229,876. Henry A. Smith to National Oil Products Co.
Dextran Benzyl Phthalate. No. 2,229,941. Grant L. Stahly and Warner W. Carlson to Commonwealth Engineering Corp.
Process for the manufacture of tetrahydrofurfuryl acrylate and its polymers. No. 2,229,997. Houston V. Claborn to use of People of U. S.
Method of recovering lithium salts from lithium-containing minerals. No. 2,230,167. Karl A. Sivander, Riddersviks Gard, Hasselby Villastad and Sven Johan Wallden to Bolidens Gruvaktiebolag.
Hydrogenated indane-diones and a method of producing same. No. 2,230,233. Elisabeth Dane to Schering Corp.
In a medicinal compound theobromin in combination with chaulmoogric acid. No. 2,230,576. Anthony J. Orlando to Arthur B. Johnson, George Grosshans and Harry Katz.
As a new and useful therapeutic composition, a bismuth nicotinate. No. 2,230,616. Edwin Dowzard and Leo A. Flexser to The New York Quinine & Chemical Works, Inc.
Extraction of protein from peanuts. No. 2,230,624. Andrew McLean to Imperial Chemical Industries, Ltd.
As a new composition having therapeutic value a nicotinate of a cinchona alkaloid. No. 2,230,631. Thom K. Thomas and Edwin Dowzard and Leo A. Flexser to The New York Quinine & Chemical Works, Inc.
Process for the production of alpha-tocopherol comprising condensing trimethylhydroquinine with phytol in the presence of phosphorous pentoxide. No. 2,230,659. Fritz von Werder to Merck & Co.
Saturated ethylamine derivatives. Nos. 2,230,752, 2,230,743, 2,230,754. Wilfrid Klavehn and Anton Wolf to E. Bilhuber Corp.
Manufacture of guanidine nitrite. No. 2,230,827. Robert Burns and Peter F. Gay to Imperial Chemical Industries, Ltd.
Acid salts of p-aminobenzene sulfonyl guanidine. No. 2,230,875. Philip Stanley Winnek to American Cyanamid Co.
Method for the production of aminothiazole which comprises reacting paraldehyde with bromine at a temperature below 15° C. and adding the reaction product to thiourea in the presence of a solvent. No. 2,230,962. Leonard Christie Leitch and Leo Brickman to Mallinckrodt Chemical Works, Ltd.
Method of preparing guanyl taurine which comprises bringing about the reaction of taurine and dicyandiamide at a temperature between 160° C. and the decomposition temperature of the reactants. No. 2,230,965. Henry P. Orem, to American Cyanamid Co.
Method of purifying crude isocytosine which comprises suspending the crude isocytosine in a dilute aqueous sulfuric acid solution and filtering off acid soluble impurities therefrom. No. 2,230,970. Jackson P. English to American Cyanamid Co.
Method of extracting labile bacterial antigenic constituents. No. 2,230,997. Leslie A. Chambers and Earl W. Flosdorf to University of Pennsylvania.
Allo-pregnane compounds and method of obtaining the same. No. 2,231,017. Russell E. Marker to Parke, Davis & Co.
Pregnanolone compounds and method of obtaining the same. No. 2,231,018. Russell E. Marker to Parke, Davis & Co.
Epi-allo-pregnanediol compounds and method of obtaining the same. No. 2,231,018. Russell E. Marker to Parke, Davis & Co.
Preparation of michler's ketone. No. 2,231,067. Philip D. Hammond and Robert W. Harris to Heyden Chemical Corp.
An ester of a tocopherol with an aliphatic carboxylic acid selected from the group consisting of stearic acid and oleic acid. No. 2,231,125. Paul Karrer to Hoffmann-LaRoche, Inc.
As a new product, 5 halo meta phenanthroline. No. 2,231,611. Jacob Boeseken and Ulbe Bijisma.
As a new product, a 5-amino compound of m-phenathroline. No. 2,231,612. Jacob Boeseken and Ulbe G. Bijisma.
Phenanthrene dicarboxylic acid anhydrides. No. 2,231,787. Roger Adams and Allene Jeanes to E. I. du Pont de Nemours & Co.
9-Aroyl-10-phenanthroic acids. No. 2,231,788. Roger Adams and Allene Jeanes to E. I. du Pont de Nemours & Co.
Trichloropropionitrile and method of preparing the same. No. 2,231,838. Joy G. Lichty to Wingfoot Corp.
N-Basically substituted compounds of the heterocyclic series. No. 2,231,844. Hans Andersag and Stephan Breitner to Winthrop Chemical Co., Inc.
Isatin derivative and a process for its manufacture. No. 2,232,034. Henry Martin, Otto Neracher and Walter Stammbach to J. R. Geigy A.G.
Bismuth Hydroxylates of polyhydrixydicarbolylic acid salts. No.

2,232,411. Clarence W. Sondern and George O. Doak to George A. Breon & Co., Inc.

Unsaturated pregnanolones and pregnandiones and a method of producing same. No. 2,232,438. Adolf Butenandt to Schering Corp.

Method of recovering calcium lactate and producing lactic acid from fermented mashes. No. 2,232,554. John Muller.

Process for the manufacture of unsaturated 3-keto-steroids. No. 2,232,636. Leopold Ruzicka to Ciba Pharmaceutical Products, Inc.

Process producing an insulin-histone composition. No. 2,232,641. David A. Scott and Albert M. Fisher to The Governors of the University of Toronto.

A nicotine salt of an alkylated aromatic sulfonic acid. A nicotine salt of an alkylated and sulfonated phenol. An insecticidal composition comprising a nicotine salt of an alkylated aromatic sulfonic acid as an active constituent thereof. No. 2,232,662. George L. Hockenyos to Monsanto Chemical Co.

Industrial Chemicals

Process reacting ester of an organic ortho trithiocarboxylic acid with an alcohol in presence of an acidic catalyst of class consisting of acids and acid-reacting salts. No. 2,229.651. William E. Hanford and Walter E. Mochel to E. I. du Pont de Nemours & Co.

Process for producing butadiene. No. 2,229,652. Paul Halbig, Norbert Platzer and Alfred Treibs to Consortium fur Elektrochemische Industrie G.m.b.H.

Improved process for producing hydrocarbon polymers of high molecular weight from isobutylene. No. 2,229,661. Matthew D. Mann, Jr. to Standard Oil Development Co.

Preparation of alkyl ketals from mercaptoles and alcohols. No. 2,229,-665. Walter E. Mechel to E. I. du Pont de Nemours & Co.

Method preparing water soluble extract high in vitamin B. No. 2,229,-684. George C. Supple, George E. Flanigan and Raymond C. Bender to The Borden Co.

Method diluting an aqueous solution of NaOH. No. 2,229,695. Frank R. Elmore to Pittsburgh Plate Glass Co.

Method preventing formation of ice crystals in compression type refrigerating system working with dichlorodifluoromethane comprises adding tetrahydrafurfuryl alcohol. No. 2,229,711. Walter O. Walker and William R. Rinelli to Ansul Chemical Company.

Laminated glass with intermediate layer of an acetal of a polymerization product containing free OH groups and free carboxylic-acid groups. No. 2,229,781. Adolf Weihe and Arthur Voss to General Aniline & Film Corp.

Welding flux compound consisting of 20 parts borax, 1 part iron sulfate and 1½ parts potassium carbonate. No. 2,229,863. Augustus A. Merrill.

Preparation and purification of zein. No. 2,229,870. Leslie O. G. Pearce to Prolamine Products, Inc.

Method of producing mineral wool. No. 2,229,974. Raymond C. Johnson and Harold J. Rose to Anthracite Industries, Inc.

Preparation of antimony oleate. No. 2,229,992. Hans Schmidt to Winthrop Chemical Co., Inc.

Electrolytic cell for recovering sodium and sulfuric acid from sodium sulfate. No. 2,230,023. Adriaan H. W. Aten to American Enka Corp.

Method of purifying an aliphatic anhydride. No. 2,230,112. Clifford I. Haney to Celanese Corp. of America.

An ester of phosphorus acid containing the group $RCOR_1$—where R is a lower alkyl group and R_1 is a lower alkylene group. No. 2,230,120. Walter D. Paist to Celluloid Corp.

Process purifying soap stock containing water and odoriferous substances, comprises heating stock to temperature sufficiently high to break down said odoriferous substances and vaporizing water and other vaporizable materials from said soap stock. No. 2,230,196. Benjamin Clayton to Refining, Inc.

Process making ruby glass comprising fusing together mixture containing siliceous material, alkali metal monoxide, and material containing cadmium sulfur and selenium. No. 2,230,199. Frank J. Dobrovolny to E. I. du Pont de Nemours & Co.

Ceramic bodies made from a mixture comprising flint, clay and a zoisitic rock. No. 2,230,206. Ira E. Sproat to R. T. Vanderbilt Co., Inc.

Reissue. Process of making alkali subsilicates. No. 21,703. Clarence W. Burkhart, Walter S. Riggs to Pennsylvania Salt Mfg. Co.

Method treating stream of gases comprising essentially normally gaseous paraffinic and olefinic hydrocarbons having from one to four atoms in each molecule to produce ethylene. No. 2,230,219. James S. Carey to The M. W. Kellogg Co.

Aqueous dispersions of terpene-maleic anhydride, polyhydric alcohol resins. No. 2,230,230. Jesse K. Boggs to Hercules Powder Co.

A composition of matter comprising essentially carbon particles and vanadium pentoxide. No. 2,230,267. Samuel Ruben.

Method of producing combined asbestos and glass fiber yarns. No. 2,230,271. Donald C. Simpson to Owens-Corning Fiberglas Corporation.

Method producing crimped fibrous glass. No. 2,230,272. James Slayter to Owens-Corning Fiberglas Corp.

Continuous cyclic process for carrying out industrial alcoholic fermentations. No. 2,230,318. Firmin Boinot to Les Usines De Melle.

Process of manufacturing glass. No. 2,230,343. George J. Bair to Norbert S. Garbisch.

Method removing finely-divided runner bar iron from waste sand obtained from the surfacing of glass plates with a slurry of essentially iron-free sand as an adhesive. No. 2,230,344. George J. Bair and John S. Cort, Jr. to Norbert S. Garbisch.

Halogenated castor oil-polycarboxylic acid products. No. 2,230,351. Arthur Hill to Imperial Chemical Industries, Ltd.

Method inhibiting catalytic deterioration of organic substance caused by member of group consisting of copper and its compounds in presence of oxygen which comprises incorporating in said organic substance a small proportion of phosphorous compound selected from class of organic minophosphonic acids and organic dihydroxyphosphines. No. 2,230,-371. Elmer Keiser Bolton to E. I. du Pont de Nemours & Co.

Method and apparatus for treating sewage sludges and the like. No. 2,230,385. Joseph S. Pecker to American Centrifugal Corp.

Process for the production of thiols. No. 2,230,390. Frank K. Signaigo to E. I. du Pont de Nemours & Co.

Production of aromatic hydrocarbons which comprises contacting normally gaseous olefins at polymerizing temperature with granular catalyst comprising a phosphoric acid and a metal of the eighth group of the periodic table. No. 2,230,461. Vasili Komarewsky to Universal Oil Products Co.

Method polymerizing or bodying fatty oils. No. 2,230,470. Alexander Schwareman to Spencer Kellogg & Sons, Inc.

Process for preparing an improved oxidation inhibitor comprising heating an aryl sulfide in admixture with an oil reactive with sulfur to a temperature above about 375° F. No. 2,230,542. Richard N. Meinert and James M. Whiteley to Standard Oil Development Co.

Process dehydrating materials selected from class consisting of castor oil and its acids. No. 2,230,549. Ben E. Sorenson to E. I. du Pont de Nemours & Co.

Process of preparing magnesia and sulfur dioxide. No. 2,230,592. Robert Griessbach and Hans Zirngibl to Walther H. Duisberg.

Process treating fluids to remove particular constituents by absorption, comprises subjecting fluid to action of a water-insoluble resin prepared by reaction of from 1 to 2 molar proportions of formaldehyde with 1 molar proportion of a mono-hydric-phenol-sulfonic acid in absence of a polyhydric phenol. No. 2,230,641. Donald M. Findlay to United States Rubber Co.

Method converting olefinic hydrocarbons to hydrocarbons of higher boiling points by polymerization thereof which comprises contacting said olefinic hydrocarbons at elevated temperature with catalytic material comprising as an essential ingredient mercury phryphosphate. No. 2,230,-648. Edwin T. Layng to The Polymerization Process Corp.

Polymerized tetrafluoroethylene. No. 2,230,654. Roy J. Plunkett to Kinetic Chemicals, Inc.

Process which comprises treating a compound of the formula $R\text{-}CO.CH_3$ wherein R. stands for a cyclopentanopolyhydrophenanthrene nucleus, the $CO.CH_3$ group being attached to the 17-carbon atom with lead tetracetate. No. 2,230,772. Max Bockmuhl, Gustav Ehrhart, Walter Aumuller to Winthrop Chemical Co.

Process which comprises treating compound of the formula $R\text{-}CO.CH_3$ wherein R stands for a cyclopentanopolyhydrophenanthrene nucleus, the $CO.CH_3$ group being attached to the 17-carbon atom with a compound of the general formula $Pb(OX)4$ wherein X stands for an acyl radical with more than 2 carbon atoms. No. 2,230,773. Max Bockmuhll, Gustav Ehrhart and Walter Aumuller and Heinrich Ruschig to Winthrop Chemical Co.

Basic esters and method of preparing them. No. 2,230,774. Max Bockmuhl and Gustav Ehrhart to Winthrop Chemical Co., Inc.

Process of refining vegetable oils. No. 2,230,796. Olof Einar Froding to The De Laval Separator Co.

Purification of volatile refrigerants. No. 2,230,892. Bruce De Haven Miller to The Girdler Corp.

Process of making alkali subsilicates. No. 2,230,919. Walter S. Riggs and Clarence W. Burkhart to Pennsylvania Salt Mfg. Co.

Preparation of 1,1,1-trifluoro-2-chloro-ethane. No. 2,230,925. Anthony F. Benning to Kinetic Chemicals, Inc.

Recovery of antimony and tin compounds from their ores. No. 2,230,-972. Stephen E. Erickson and Arvid E. Anderson to American Cyanamid Co.

Conversion of hydrocarbons. Nos. 2,230,978, 2,230,979 and 2,230,980. Robert F. Ruthuff to The Polymerization Process Corp.

Process for making alkenyl benzenes. No. 2,231,026. William M. Quattlebaum and Donald M. Young to Carbide and Carbon Chemicals Corp.

Process of reducing aluminum sulfate to metallic aluminum. No. 2,231,030. Sherman W. Scofield and John B. LaRue, deceased, said to Sherman W. Scofield.

Process for concentrating phosphate ores. No. 2,231,066. Ernest W. Greene and Robert M. Wilbur to Coronet Phosphate Co.

Method of removing soluble impurities from magnesium hydroxide. No. 2,231,154. Heinz H. Chesny.

Process for the reduction of ferric compound comprises passing sulfur dioxide into a solution containing a ferric compound in presence of substantially pure carbon in activated form. No. 2,231,181. Maxwell J. Brooks to General Chemical Co.

A cobalt oxide catalyst and process for oxidation of ammonia using said catalyst. No. 2,231,202. Vernon M. Stowe to The Solvay Process Co.

Distillation process for resolving a complex narrow boiling point range of paraffinic compounds into sharply cut fractions. No. 2,231,241. James R. Bailey to Union Oil Co. of Calif.

Lubricant containing sulfurized monoester of fatty acid, tricresyl phosphate and a monohydric, high M.W. fatty alcohol. No. 2,231,301. Herschel G. Smith to Gulf Oil Corp.

Process recovering fluorine values from waste gases from electrolytic production of aluminum. No. 2,231,309. Julius Weber to Det norske Aktieselskab for Electrokemisk Industri.

Process for production magnesium sulfate. No. 2,231,327. William H. Farnsworth and Clair H. Martin to Morton Salt Co.

Colloidal suspension of fuller's earth. No. 2,231,328. Ogden F. Simons to Floridin Co.

As new compositions of matter, compounds of the general formula $X\text{-}CH_2\text{—}CHCl\text{—}CN$, where X is selected from the group consisting of chlorine and hydroxyl. No. 2,231,360. James D'Ianni to Wingfoot Corp.

Preparation of alpha-chloracrylonitrile. No. 2,231,363. John R. Long to Wingfoot Corp.

Process effecting condensation comprises reacting formaldehyde with a nitroparaffin in presence of a liquid ionizing dilluent, an alkali, and an ionizable oxalate soluble in reaction medium. No. 2,231,403. Joseph A. Wyler to Trojan Powder Co.

Separation of low boiling components from a wide boiling range mixture. No. 2,231,444. Clarence G. Gerhold to Universal Oil Products Co.

Process for producing improving products for pelts, furs, hairs, and textiles of all kinds. No. 2,231,594. Elmar Profft to Vereingte Glanzstoff-Fabrieken A.G.

Process of obtaining fuel oil from digested sludge. No. 2,231,597. Saburo Shibata.

Industrial ethyl alcohol denatured with 0.5 to 5 parts mesityl oxide, as essential denaturing elements per 100 parts of 95% ethyl alcohol. No. 2,231,664. Louis J. Figg, Jr. to Eastman Kodak Co.

Inorganic mica bonding material. No. 2,231,718. Lawrence R. Hill to Westinghouse Electric and Manufacturing Co.

Composition comprising a cellulose organic acid ester and, as plasticizer therefor, a dilactate of a glycol containing from 3 to 6 carbon atoms. No. 2,231,729. Lester W. A. Meyer to Eastman Kodak Co.

A tempered glass article composed of a glass having a strain tempera-

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ture of not less than 506° C. and a setting range of less than 300° C. No. 2,231,811. Jesse T. Littleton, William W. Shaver and Howard R. Lillie to Corning Glass Works.

Plasticized cellulose acetate compositions. No. 2,231,818. Ernest A. Rodman to E. I. du Pont de Nemours & Co.

Process comprising reacting acetylene with a cyclic imide derived from a hydroaromatic dicarboxylic acid in the liquid phase in the presence of catalyst comprising as essential catalytic component a mercury salt. No. 2,231,887. Rollin Francis Conaway to E. I. du Pont de Nemours & Co.

Method deriving a free acid from a salt thereof. No. 2,231,898. Ed. M. Frankel and Arthur Pollak to West Virginia Pulp & Paper Co.

Process hydrating calcined gypsum without substantial setting thereof which comprises agitating one part of calcined gypsum with substantially 1½ to 2 parts of a dilute aqueous solution of an alkali metal phthalate. No. 2,231,901. Joseph W. Gill to United States Gypsum Co.

Aliphatic vinyl tertiary amides. No. 2,231,905. Wm. Ed. Hanford and Halsey B. Stevenson to E. I. du Pont de Nemours & Co.

Calcium oxide-chromium oxide-zirconium oxide refractory. Nos. 2,231,944 and 2,231,945. Gordon R. Pole.

Method of carbonating lime and separating same from magnesia. No. 2,231,965. Horace E. Stump.

Process sulfonating organic compounds heretofore known to be capable of sulfonation comprising sulfonating said compounds by reacting with addition product of sulfur tri-oxide and a salt of an inorganic oxygen acid of nitrogen. No. 2,231,979. Erhart Wolter to The Procter & Gamble Co.

Process for manufacture hydrocarbons by reaction between carbon monoxide and hydrogen in presence of hydrogenating catalyst. No. 2,231,990. Henry Dreyfus.

Process concentrating hexamethyleneimine which is in admixture with water which comprises bringing said mixture to a temperature below its boiling point but sufficiently elevated to cause a separation of said mixture into two layers and separating said layers. No. 2,232,059. Mark W. Farlow to E. I. du Pont de Nemours & Co.

Process of decomposing calcium sulfate into calcium oxide and oxides of sulfur. No. 2,232,099. Fredrik W. deJahn to Alan N. Mann.

Process decomposing barium sulfate into barium oxide and oxides of sulfur. No. 2,232,100. Fredrik W. deJahn to Alan N. Mann.

Wetting agent comprising essentially a mixture of water-soluble salts of mono-sulfonated alkyated benzene compounds. No. 2,232,117. Lucas P. Kyrides to Monsanto Chemical Co.

Detergent comprising essentially a mixture of water-soluble salts of mono-sulfonated alkylated benzene compounds. No. 2,232,118. Lucas P. Kyrides to Monsanto Chemical Co.

Arsonic acid and process of preparing it. No. 2,232,232. Walter Herrmann and Friedrich Hampe to Winthrop Chemical Co., Inc.

Method of producing ammonium sulfamate. No. 2,232,241. Louis C. Jones to American Cyanamid Company.

Method of producing fluorsparbearing metallurgical flux. No. 2,232,-242. Fred A. Jordan to Mahoning Mining Co.

Process of drying whey. No. 2,232,248. Charles O. Lavett to Buffalo Foundry & Machine Co.

Process for treating liquids containing organic impurities which comprises adding thereto a magnetic material and precipitating said material and impurities by means of a magnetic field. Nos. 2,232,294 to 2,232,-296. Oliver M. Urbain and Wm. R. Stemen to Charles H. Lewis.

Method preparing margarine. No. 2,232,401. Roy C. Newton and Leo C. Brown to Industrial Patents Corp.

Method for preparation of a terpin lower fatty acid ester comprises reacting terpin with lower fatty acid anhydride at temperature within the range of about 60° C. to about 125° C. and then separating the terpin ester from reaction mixture. No. 2,232,433. Joseph N. Borglin to Hercules Powder Co.

Terpin dibutyrate. No. 2,232,434. Joseph N. Borglin to Hercules Powder Co.

Process for the manufacture of soap and recovery of the glycerin and other volatile unsaponifiable matters. No. 2,232,544. Henry W. F. Lorenz.

Wax-polymer blend containing per 100 parts by weight at least 60 parts of mineral wax, and at least 15 parts of a polymeric alkyl methacrylate the alkyl group of which contains more than 2 carbno atoms. No. 2,232,595. Harry R. Dittmar and Reginald G. Kennelly to E. I. du Pont de Nemours & Co.

Process for producing amides comprises catalytically hydrogenating a saturated aliphatic nitrile in presence of a carboxylic acid ester. No. 2,232,598. Mark W. Farlow to E. I. du Pont de Nemours & Co.

Catalytic hydration of olefins. No. 2,232,610. Walter P. Joshua, Herbert M. Stanley and John Blair Dymock.

Method conducting an organic chemical reaction between at least two reactants at least one of which is an organic compound in liquid phase. No. 2,232,674. Frederic M. Pyzell to Shell Development Co.

Leathers and Tanning

In treatment of leather, step of applying composition of matter comprising grapefruit seed oil. No. 2,229,976. Philip Kaplan to The Richards Chemicla Works, Inc.

Process producing condensation products having good tanning action. No. 2,230,564. George R. Gasnier to Jacques Wolf & Co.

Metals, Alloys

Method forming silver-lead alloy in presence of lithium. No. 2,229,667. Harold J. Ness.

Process for reduction of a metal of group consisting of zinc, cadmium and mercury. No. 2,229,716. Harold A. Blackwell and William L. Turner to Lancashire Metal Subliming Corp, Ltd.

Apparatus for preventing carbon deposit during box annealing. No. 2,229,792. Samuel H. Bobrov.

Composition for molds for metal casting comprising 40-80% silica, 15-16% plaster of Paris, 0.25-3% ammonium bromide. No. 2,229,946. George Clyde Van Allen to Baker & Co., Inc.

Art of inhibiting rust formation. No. 2,230,004. John D. Morgan to Power Patents Co.

Manganese alloys. Nos. 2,230,236 and 2,230,237. Reginald S. Dean to Chicago Development Co.

Method removing phosphorous, by reduction and vaporization, from ores, containing at least one of the metals, iron and manganese. No. 2,230,337. Carl Von Delwig.

Method heat treating articles of steel in a furnace chamber. No. 2,230,484. John A. Comstock to Surface Combustion Corp.

Heat treatment of copper-chromium alloy steels. Nos. 2,230,531 and 2,230,532. Wm. P. Digby to Everard Tuxford Digby and himself.

Process of separating vanadium from titanium. No. 2,230,538. Leslie G. Jenness and Roger L. Annis to Vanadium Corp. of America.

Process for concentrating lead-iron mineral ores by froth flotation process comprising frothing-up of mineral with a metal phenol sulfonate containing an alkyl group having 4-22 carbon atoms, and floating off the froth concentrate from the gangue. No. 2,230,565. Peter J. Gaylor to Standard Oil Development Co.

Method of coating metals with lead. No. 2,230,602. John D. Sullivan to Battelle Memorial Institute.

A high speed steel alloy. No. 2,230,687. Eduard Houdremont and Hans Schrader to Pantena, Ltd.

Base metal alloy including about 40% molybdenum, 40% copper and 2% cobalt. No. 2,230,804. Charles J. Koebel to Koebel Diamond Tool Co.

An alloy of 30% to 75% zinc, 2% to 15% copper and balance substantially pure manganese, the manganese being present in proportions at least equal to that of the copper. No. 2,230,969. Reginald S. Dean to Chicago Development Co.

Heat treating process. Nos. 2,231,009-010. Donald A. Holt to E. I. du Pont de Nemours & Co.

Method of producing oxide coated aluminum and aluminum base alloys and electrolyte therefor. No. 2,231,086. Alwin Muller and Joachim Korpiun to Sherka Chemical Co., Inc.

Process for producing malleable iron castings. No. 2,231,120. Gerth Herrmann.

Process of ore concentration. No. 2,231,265. Antoine M. Gaudin.

Method of reducing iron ores and the like. No. 2,231,760. Charles V. Foerster, Jr., Howard L. Griswold and Arthur T. Cape.

A magnesium base alloy. No. 2,231,881. Arthur Burkhardt and Richard Knabe to Georg Von Biesche's Erben.

Alloy composed of approximately 86-96% copper, 3.3-5.2% aluminum, 4.25-5.5% tin, and .1-.75% silicon. No. 2,231,940. Charles V. Nylander.

A lead-base alloy consisting of 6-16% antimony, 1.5-6% arsenic, the antimony and arsenic together totalling at least 13%, 0.2-2.5% tin, and lead. No. 2,232,185. Albert J. Phillips and Paul A. Beck to American Smelting & Refining Co.

Production of magnetic material. No. 2,232,352. Evert Johannes W. Verweij, Jan H. deBoer and Theodorus A. Spoor to Radio Corp. of America.

Process for obtaining steels having high micrographic purity. No. 2,232,403. Rene Perrin to Societe d'Electrochimie.

Method of separating cobalt from solution containing cobalt, zinc and nickel consisting in adding a soluble alkaline precipitant to the warm solution until the pH rises to 7.0 and thereafter passing in chlorine until the pH falls to 2.5. No. 2,232,527 Cyril Thomas Hill to The Pyrites Co.

Paints and Pigments

Manufacture of lacquer raw material from a fossil resin by heating said resin with tetrahydronaphthalene and an aliphatic alcohol to temperature near M.P. of the resin. No. 2,230,198. Alfred Dierichs and Leo Rosenthal to I. G. Farbenindustrie Aktiengesellschaft.

Dispersible pigment composition. No. 2,230,353. Jean G. Kern to National Aniline & Chemical Co., Inc.

As component for production of hydraulic paints, a liquid mixture consisting of an excess of hydrated lime with smaller but effective amounts of calcium stearate sodium chloride, magnesium sillicate, and ammonium stearate the said mixture being incorporated in sufficient water to produce a freely-flowing liquid product. No. 2,230,747. Joel A. Greene to Somay Products, Inc.

Corrosion-resistant paint comprising in an organic solvent chlorinated rubber and hardened deploymerized vulcanized rubber solution. No. 2,231,370. Herbert J. Reid to United States Rubber Co.

Process for controlling subordinate tint of gray titanium pigments. No. 2,231,455. Holger H. Schaumann, Robert K. Whitten and Robert W. Ball to E. I. du Pont de Nemours & Co.

Process for producing improved buff titanium pigments. No. 2,231,456. Holger H. Schaumann and Robert K. Whitten to E. I du Pont de Nemours & Co.

High surface hiding pigment material and process of making the same. Nos 2,231,467-468. Marion L. Hanahan to E. I. du Pont de Nemours & Co.

Pigment material and method of producing same. No. 2,232,164. Howard K. Carter to E. I. du Pont de Nemours & Co.

Titanium pigment and method of producing same. No. 2,232,168. David H. Dawson to E. I. du Pont de Nemours & Co.

Petroleum

Process for separating wax from oil. Nos. 2,229,658-659. Vance N. Jenkins to Union Oil Company of California.

Lubricant comprising mineral oil and small amount of a cyclohexyl amine. No. 2,229,858. Elliott B. McConnell to the Standard Oil Co. Corp. of Ohio.

Process for removing acid components from hydrocarbon distillates. No. 2,229,995. David L. Yabroff and Ellis R. White to Shell Development Co.

Flooding process for recovering oils. No. 2,230,001. Glenver McConnell and Horace V. Steadman to Shell Development Co.

Process for the production of valuable products from cracked petroleum distillates. No. 2,230,005. Franz R. Moser to Shell Development Co.

Lubricating oil of improved emulsive properties comprising refined mineral oil to which has been added a small amount of reaction product of a tertiary organic amine and hydrogen peroxide. No. 2,230,022. Mario S. Alltamura, Henry G. Berger and Darwin E. Badertscher to Socony-Vacuum Oil Co., Inc.

Process for purification of resin-forming unsaturated hydrocarbon content of a light oil fraction. No. 2,230,274. Frank J. Soday to The United Gas Improvement Co.

Method for cataytic cracking of heavy hydrocarbon oil to gasoline. No. 2,230,464. Robert F. Marschner to Standard Oil Co.

U. S. Chemical Patents

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Lubricant with high temperature stability. No. 2,230,543. Louis A. Mikeska and Joseph F. Nelson to Standard Oil Development Co.

Method making gasoline having high octane number and low acid heat comprises passing oil having aniline point below 155° F. and mid boiling point below 600° F. through cracking zone in contact with catalyst comprising silica and alumina, maintaining said cracking zone at 700-800° F. and thereafter separating gasoline fraction from cracked products. No. 2,230,552. Alexis Voorhies, Jr. to Standard Oil Development Co.

Foam suppressor for soluble oils. No. 2,230,556. John C. Zimmer and George M. McNulty to Standard Oil Development Co.

Process for separating the effluents from an oil well into a dry gas and liquid comprising crude oil. No. 2,230,619. Donald L. Katz to Phillips Petroleum Co.

A liquid fuel oil composition. No. 2,230,642. Herbert G. M. Fischer and Stewart H. Hulse to Standard Oil Development Co.

Lubricant containing corrosion inhibitor. No. 2,230,691. Arthur Walther Lewis to Tide Water Associated Oil Co.

Method improving ignition characteristics of Diesel fuel comprising treatment with mixture of sodium plumbite solution and sulfur in presence of added mercapton, said sulfur being used in quantities ranging from about 50-350% in excess of the theoretical amount required to sweeten said distillate. No. 2,230,817. Bernard H. Shoemaker to Standard Oil Company.

High octane number motor fuel. No. 2,230,844. Pharis Miller and August Y. Mottlau to Standard Oil Development Co.

Stabilized high boiling petroleum fractions. No. 2,230,966. Ebenezer E. Reid and Lyle A. Hamilton to Socony-Vacuum Oil Co.

Lubricating oil containing 0.5-2.5% of an oil-soluble soap of hydrogenated rosin acids. No. 2,231,022. David R. Merrilll to Union Oil Company of California.

Solvent treating of mineral oils. No. 2,231,147. Carroll J. Wilson to Standard Oil Development Co.

Composition of matter comprising a waxy mineral lubricating oil and a condensation product. No. 2,231,148. Jeffrey H. Bartlett to Standard Oil Development Co.

Lubricating composition. No. 2,231,248. Frank P. Bowden.

Process treating alunite to form material for decolorizing and refining mineral ois. No. 2,231,318. George S. Bernard, Jr. to Auminum Co. of America.

Petroleum hydrocarbon composition resistant to gum formation comprising a petroleum hydrocarbon that on storage will form gum, to which has been added a small percentage of the reaction product of trichlorpropane + p-phenylenediamine. No. 2,231,344. Augustine F. S. Musante and John H. Perrine to Sun Oil Co.

Method for catalytic treatment of iso-butane gas. No. 2,231,424. Walter F. Huppke to Union Oil Co. of California.

Process for catalytic dehydrogenation of hydrocarbons. No. 2,231,446. Aristid V. Grosse to Universal Oil Prods. Co.

Process for producing higher molecular weight hydrocarbons from paraffin and olefin hydrocarbons. No. 2,231,452. Jacque C. Morrell to Universal Oil Prods. Co.

Method removing relatively volatile liquid from mixture of such volatile liquid and viscous liquid, having a tendency to foam on heating. No. 2,231,544. Wilmer E. McCorquodale, Jr. and Charles H. Brooks to Sun Oil Co.

Process for resolving petroleum emulsions of the water-in-oil type. Nos. 2,231,753 to 759. Melvin DeGroote to Petrolite Corp., Ltd.

Method increasing anti-knock properties of motor fuel. No. 2,231,803. Harry E. Drennan to Phillips Petroleum Co.

Catalytic condensation of normally gaseous hydrocarbons. No. 2,231,-831. Roderick D. Pinkerton to Sinclair Refining Co.

Method of copper chloride sweetening comprising saturating sour petroleum distillate with water, drying portion of said saturated distillate with passing both dried and undried portions of said distillate into contact with copper chloride sweetening reagent disposed on solid carrier. No. 2,232,048. John A. Bolt, Bernard H. Shoemaker to Standard Oil Co.

Lubricant comprising hydrocarbon oil and relatively small proportion of a plastic material including homogeneous body composed of plasticizing proportions of an organic phosphine and an organic elastic compound from group consisting of rubber, rubber latex, gum rubber, halogenated rubber, synthesized rubber compounds, indian caoutchouc, paracaoutchouc, gutta percha and balata. No. 2,232,421. Arnold R. Workman to Cities Service Oil Co.

Process making lubricating and solvent oils from cracked residual petroleum. No. 2,232,435. Robert E. Burk to The Standard Oil Co.

Process purifying light petroleum distillates. No. 2,232,436. Robert E. Burk and Everett C. Hughes to The Standard Oil Co.

Solvent dewaxing process. No. 2,232,603. Henry H. Hardin to Socony-Vacuum Oil Co., Inc.

Improved lubricant composition comprising a major amount of a mineral oil and a minor amount of an aryl sulfonyl chloride incorporated therein. No. 2,232,649. Laszlo Auer to Gulf Oil Corp.

Resins, Plastics

Manufacture condensation products comprises reacting upon a carbonyl compound selected from aromatic-aliphatic and hydroaromatic series with a beta-halogen propionic acid ester in presence of metal group consisting of Mg and Zn. No. 2,229,999. Gerhardt Haberland to Winthrop Chemical Co., Inc.

Polyvinyl chloride composition and sheets. No. 2,230,000. Otto Hauffe and Wilhelm Wehr to Deutsche Celluloid-Fabrik.

Noncrystalline resin product. No. 2,230,035. Torsten Hasselstrom to G. and A. Laboratories.

In process of manufacture of water soluble hardenable resins, step of reacting methylal ureas in presence of water with substance from group consisting of ammonia and hexamethylene tetramine. No. 2,230,121. Fritz Pollak.

Process for the manufacture of plastic compositions. No. 2,230,127. Hermann Basler.

Process of and apparatus for forming articles from plastic material. No. 2,230,188. Enoch T. Ferngren to Plax Corp.

Plastic composition having improved browing-out and surface-drying characteristics. No. 2,230,211. Manvel C. Dailey to United States Gypsum Co.

Method for making a resinous product from vinyl compounds and anhydrides of unsaturated dicarboxylic acids. No. 2,230,240. Howard L. Gerhard to The United Gas Improvement Co.

Production of terpenic phenolaldehyde resin. No. 2,230,266. Israel Rosenblum.

Dioctylamine-adipic acid resin and the production thereof. No. 2,230,-326. Almon G. Hovey and Theodore S. Hodgins to Reich Company, Inc.

Printing plates and printing units comprising interpolymerization products of styrene with a nitrile selected from the group consisting of acrylic and methacrylic nitrile. No. 2,230,776. Claus Heuck and Adolf Freytag to I. G. Farbenindustrie Aktiengesellschcft.

Apparatus for making tiles from plastic materials. No. 2,230,778. Raymond M. Flores to Theresa K. Ellis.

Printing plates and printing units comprising a polymerization product of methacrylic acid methyl ester. No. 2,230,784. Walter Reppe and Adolf Freytag to I. G. Farbenindustrie Aktiengellschaft.

Process for recovering phenols from resins of phenols and aldehydes which comprises treating said resins under a pressure of from about 20 to about 200 atmospheres with hydrogenated cyclic hydrocarbons at from 300° C. to 500° C. No. 2,230,812. Mathias Pier, Walter Simon and Georg Grassl to General Aniline & Film Corp.

As a new article of manufacture, a printing plate presenting water-receptive areas comprising a polyvinyl alcohol. No. 2,230,981. Wm. C. Toland and Ellis Bassist to Wm. Craig Toland.

That improved method of making planographic printing plates which consists in providing a suitable base, coating a hydrophilic resin upon said base, and selectively locating grease-receptive printing layers on said hydrophilic resin. No. 2,230,982. Wm. C. Toland and Ellis Bassist to Wm. Craig Toland.

Transparent petroleum plastics. No. 2,231,419. Alvin P. Anderson to Shell Development Co.

Laminated glass bonded with plastic sheet comprising an interpolymer of methyl methacrylate and another derivative of methacrylic acid. No. 2,231,471. Rowland Hill to Imperial Chemical Industries.

Process for the production of high molecular nitrogenous condensation products. No. 2,231,502. Hans Krzikalla, Paul Garbsch and Wilhelm Pannwitz to General Aniline and Film Corp.

Artificial resins soluble in drying oils and process of producing the same. No. 2,231,649. Werner Wolff to General Aniline and Film Corp.

Polyvinyl acetal resin composition containing esters of alkoxybenxoic acids. No. 2,231,733. James B. Normington and Fred C. Duennebier to Eastman Kodak Co.

Process for the production of a phenolbutyraldehydeformaldehyde resin. No. 2,231,860. Lloyd C. Swallen to Monsanto Chemical Co.

In a dialyser a dialysing diaphragm comprising a tanned polymerized vinyl composition. No. 2,232,153. Herbert Vohrer.

Process for compression molding of polymer of ethylene. No. 2,232,-475. Archibald Renfrew and James W. Davison to Imperial Chemical Industries, Ltd.

Synthetic resin prepared by interpolymerizing a mixture of a methacrylic acid ester and a 1,3-butadiene. No. 2,232,515. Harold W. Arnold and George Dorough to E. I. du Pont de Nemours & Co.

Dimethylolurea-ester resinous reaction products. No. 2,232,609. Ralph A. Jacobson to E. I. du Pont de Nemours & Co.

Apparatus for the manufacture of molded articles from solid or semi-solid polymerization products. No. 2,232,644. Walter Kohler.

Rubber

Rubber derivative and preparation thereof. No. 2,230,359. James P. McKenzie to Marbon Corp.

U. S. Chemical Patents

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Process of plasticizing rubber. No. 2,230,729. Manuel H. Savage, Francis E. Spargo and Emil W. Schwartz to General Electric Co.

Process comprising exposing at elevated temperature synthetic rubberlike materials prepared by emulsion polymerization of butadiene-1.3 hydrocarbons to oxidizing treatment by means of oxygen in presence of antioxidants and of hydrazone prepared from mono-substituted hydrazines. No. 2,230,894. Walter Gumlich to Jasco, Inc.

Method vulcanizing rubber material of a uniformly elastic nature. No. 2,231,057. Ernest O. Dieterich, deceased, by Kathryn J. Dieterich to The B. F. Goodrich Co.

Process of treating rubber which comprises vulcanizing the same in the presence of a 2-arylene thiazyl-2-thiothiodiazole. No. 2,231,353. George W. Watt to Wingfoot Corp.

Manufacture of new synthetic rubberlike materials comprises polymerizing, in aqueous emulsion, an ester of beta-(2-furyl) acrylic acid with a member of group consisting of butadiene-1,3 and its methyl homologues. No. 2,231,623. Bernard J. Habgood, Elias Isaacs and Leslie B. Morgan to Imperial Chemical Industries, Ltd.

Method of manufacturing closed cell expanded rubber without precure. No. 2,231,950. Dudley Roberts and Roger Charles Bascom to Rubatex Products, Inc.

Composition of matter comprising chlorinated rubber and products obtained by halogenating material obtained by Friedel-Crafts reaction of an aromatic hydrocarbon with a hydrocarbon having at least one halogen atom attached to an acyclic C atom. No. 2,232,429. Nicholas Bennett to Imperial Chemical Industries, Ltd.

Textiles

In treatment of textile fibers, step of applying composition of matter comprising grapefruit seed oil. No. 2,229,975. Philip Kaplan to The Richards Chemical Works, Inc.

Process treating ramie, includes steps of subjecting ramie fiber to successive acid and alkali treatment baths to remove major part of the gum and produce mat or mass of intermingling fibers held together by small amount of unremoved gum, drying and separating fibers and dampening with emulsion and subsequently spinning the fibers. No. 2,230,269. Charles R. Pierce to E. B. Elliott.

Process of sizing fabrics. No. 2,230,358. Martin W. Mason to Pittsburgh Plate Glass Co.

Production of staple fibers from continuous filaments. No. 2,230,396. Charles W. Addy and Reginald J. Grinnell to Celanese Corp. of Amer.

Aqueous impregnating solution for preservative treatment of textile fabrics comprising substantially 10 grams of arsenious acid, 15 grams of an alkali metal bichromate and 20 grams of a mild reducing agent soluble in water per liter of solution. No. 2,230,748. Bror Olof Hager to Bolideno Gruvaktiebolag.

Method for sizing textile fabric. No. 2,230,792. Wyly M. Billing to Hercules Powder Co.

Method of bleaching gray goods made of unboiled cellulose. No. 2,231,426. Hans O. Kauffmann to Buffalo Electro-Chemical Co., Inc.

Sized textile and method of sizing textiles. No. 2,231,458. William W. Trowell to Hercules Powder Co.

Apparatus for producing a continuous silver composed of rayon staple fibers from endless rayon filaments. No. 2,231,497. Fritz Gajewski, Fritz Melms and Kurt Jehle to Walther H. Duisberg.

Method of stretching in the viscose process of manufacturing artificial sillk thread. No. 2,231,851. Hayden B. Kline and Louis S. Fryer to Industrial Rayon Corp.

Process for improving the dyeing properties of artificial fibers, foils, films, ribbons and the like, and products obtained therefrom. No. 2,231,-890. Paul Esselmann and Josef Dusing to Walther H. Duisberg.

Process of producing natural or artificial fibers having dyeing properties resembling those of wool and products obtained thereby. No. 2,231,-891. Paul Esselmann Wolfen and Josef Dusing to Walther H. Duisberg.

Textile materials capable of being dyed with acid wool dyestuffs in same manner as wool, comprising a film or fiber-forming polymer incapable per se of being dyed by acid dyes said polymer containing resinous product of joint polymerization of three resin components, an alkylene imine, a sulfur compound and a compound from group consisting of arylthiocyanates and arylisothiocyanates. No. 2,231,892. Paul Esselmann and Josef Dusing to Walther H. Duisberg.

Manufacture of extensible slivers of artificial fibers. No. 2,232,299. Walther Zetzsche and Franz Schiele to Walther H. Duisberg.

Artificial textile materials capable of being dyed by acid wool dyestuffs in same manner as wool. No. 2,232,318. Paul Esselmann and Josef Dusing to Walther H. Duisberg.

Process of and apparatus for the production of viscose solutions. No. 2,232,326. Gustav A. M. Heim to American Enka Corp.

Process for the production of artificial thread. No. 2,232,542. Everett V. Lewis to E. I. du Pont de Nemours & Co.

Lubricating and softening of textile materials. No. 2,232,565. Ernest Segessemann to National Oil Products Co.

Production of high quality benzine and diesel motor fuels. No. 2,232,673. Theodor W. Pfirrmann.

Abstracts of Foreign Patents

Collected from Original Sources and Edited

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Those making use of this summary should keep in mind the following facts:

Belgian and Canadian patents are not printed. Photostats of the former and certified typewritten copies of the latter may be obtained from the respective Patent Offices.

English *Complete Specifications Accepted* and French patents are printed, and copies may be obtained from the respective Patent Offices.

In spite of present conditions, copies of all patents reported are obtainable, and will be supplied at reasonable cost by E. L. Luaces, 1107 Broadway, New York.

This digest presents the latest available data, but reflects the usual delays in transportation and printing. We expect to begin reporting German patents in the near future. Your comments and criticisms will be appreciated.

CANADIAN PATENTS

Granted and Published October 29, 1940.

Method of increasing the yield of an oil deposit in the earth by repressuring it *in situ* with steam after the natural gas pressure has substantially fallen. No. 392,113. Mark Benson.

Manufacture of acetylene by passing vapors of normally liquid hydrocarbons under partial pressure at most of one atmosphere through externally heated tubes wherein they are subjected to temperature between 600° and 1000° C. for a short period, and then suddenly raised above 950° C. and higher in first heating stage. No. 392,121. Henry Dreyfus.

Apparatus for recovering chemicals and heat from liquor containing organic matter (such as paper mill wastes). No. 392,146. George H. Tomlinson and The Babcock & Wilcox Company. (George H. Tomlinson and Leslie S. Wilcoxson.)

An ignition compound comprising a basic lead salt of tetranitrodiphenyl propane and an oxidizing agent. No. 392,168. Canadian Industries Limited. (William F. Filbert and Walter E. Lawson.)

Flotation process of concentrating nonmagnetic oxides of iron using a betaine compound. No. 392,169. Canadian Industries Limited. (James E. Kirby and Joseph L. Gillson.)

Flotation process of concentrating carbonate minerals containing siliceous impurities using a salt of an amino naphthene derived from naphthenic acids having about 11-19 carbon atoms. No. 392,170. Canadian Industries Limited. (James E. Kirby and Joseph L. Gillson.)

Anode assembly for a fused salt electrolysis cell. No. 392,171. Canadian Industries Limited. (Russel L. Hardy and Robert E. Hulse.)

Unsymmetrical carbocyanine dye. No. 392,173. Canadian Kodak Co., Ltd. (Leslie G. S. Brooker and Frank L. White.)

Preparing a simple cyanine dye by treating a cyclammonium iodide with an alkyl nitrate in presence of an organic acid anhydride. No. 392,174. Canadian Kodak Co., Ltd. (Frances M. Hamer.)

Dye selected from oxatricarbocyanine, benzoxatricarbocyanine, and dibenzoxatricarbocyanine dyes. No. 392,175. Canadian Kodak Co., Ltd. (Grafton H. Keyes.)

Purifying gelatine by treating an aqueous solution of it with a base-exchange alkali metal zeolite. No. 392,176. Canadian Kodak Co., Ltd. (Edwin E. Jelley.)

Rubber dispersed in an aqueous medium with the aid of alkali silicate-saponified soap. No. 392,195. Dispersions Process, Inc. Roswell H. Ewart.)

Homogenizing devices. Nos. 392,197 to 392,200. Dodge Emulsor Corp. (John D. Dodge.)

A self-emulsifying composition of matter useful as protective coating for fruit. E. I. du Pont de Nemours & Co., Inc. (Wendell H. Tisdale and Albert L. Flenner.)

Moisture-proofing composition suitable for cellophane. No. 392,203. E. I. du Pont de Nemours & Co., Inc. (Richard T. Ubben.)

Silver-copper-manganese-zinc-nickel silicon alloys. No. 392,208. Handy & Harman. (Robert H. Leach.)

Silver-copper-manganese-nickel-silicon alloys. No. 392,209. Handy & Harman. (Robert H. Leach.)

Production of rubber thread by coagulation of extruded latex. No. 392,211 (see also No. 392,212). International Latex Process Limited. (Robert G. James and Sydney F. Smith.)

High-resistance welding electrode comprising 30% tungsten, 30% tungsten carbide, 28% copper and 12% nickel. No. 392,214. P. R. Mallory & Co., Inc. (Franz R. Hensel.)

Bleaching of cellulosic materials with chlorites. No. 392,215. Mathieson Alkali Works. (Maurice C. Taylor and George P. Vincent.)

Carbon zinc element for use in dry cells or batteries. No. 392,216. Maxolite Holdings Limited. (Frank MacCullum.)

Treatment of absorption products of olefines of at least five carbon atoms per molecule in strong polybasic mineral acids. No. 392,223. Shell Development Company. (Anton J. Tulleners.)

Alloy for storage battery electrodes consisting of 0.01-0.15% Ca, 0.005-0.5% Ba and the balance Pb. No. 392,240. Western Electric Company, Inc. (George M. Bouton and Earl E. Schumacher.)

Conversion of acetylene series compounds into those of the ethylene series by treatment in aqueous solution of metal hydroxide with metallic zinc. No. 392,256. I. G. Farbenindustrie A. G. (Walter Reppe, Alexander Rothhaas, Otto Schmidt and Rolf Leuhdemann.)

Conversion of acetylene series compounds into those of ethylene series by treating in aqueous medium in presence of basis reacting nitrogen compounds with metallic zinc. No. 392,257. I. G. Farbenindustrie A. G. (Walter Reppe and Alexander Rothhaas.)

Divinyl ether stabilized with a substituted phenol of the group consisting of hydroquinone, pyrogallol, p-N-isopropylaminophenol, p-aminophenol, and P-N-methylaminophenol. No. 392,258. Merck & Co., Inc. (Rabdolph T. Major and William L. Ruigh.)

Process comprising treating duroquinone in an organic solvent with hydrogen in presence of a hydrogenation catalyst. No. 392,259. Merck & Co. Inc. (Fritz Jung.)

Process of producing dyeings of improved fastness with wool dyestuffs on animalized cellulosic material. No. 392,262. (Wilhelm Tischbein, Otto Bayer, Johannes Nelles and Fritz Ruf.)

Conversion of acetylene series compounds to those of ethylene series by treatment with aqueous suspension of zinc activated with copper and cadmium. No. 392,264. (Albert Auerhahn and Robert Stadler.)

Granted and Published November 5, 1940.

Textile fabric containing yarn formed from fibres at least some of which are composed of an organic derivative of cellulose. No. 392,273. Camille Dreyfus.

Process of producing high permeability silicon steel. No. 392,286. The American Rolling Mill Company. (Guerney H. Cole and Robert L. Davidson.)

Producing dispersion of paracoumarone resin by melting the resin and distributing it throughout an aqueous alkaline colloidal clay jelly. No. 392,289. The Barrett Company. (Earl G. Kerr.)

Photographic developing solution comprising as developer a 6-amino-1, 2, 3, 4-tetrahydroquinoline having on the heterocyclic nitrogen atom a substituent selected from alkyl, hydroxyalkyl, and allyl groups, and as coupling agent a compound which combines with the oxidation product of the developing agent on photographic development to produce a colored image. No. 392,304. Canadian Kodak Co., Ltd. (Willard D. Petersen.)

Producing black and white photographic image by reversal by developing the reversal image in a coupler developer containing a p-phenylene diamine developing agent and a p-benzyl phenol coupler compound. No. 392,305. Canadian Kodak Co., Ltd. (Ralph M. Evans and Wesley T. Hanson, Jr.)

Photographic film for use in color photography having low dye retention subbing layers. No. 392,306. Canadian Kodak Co., Ltd. (Gale F. Nadeau.)

Bleaching cellulosic materials without substantial degradation of fibre by suspending the material in aqueous medium and introducing a mixture of chlorine and chlorine dioxide into the suspension. No. 392,333. The Mathieson Alkali Works. (George P. Vincent.)

Apparatus for froth flotation of ores. No. 392,336. Minerals Separation North American Corporation. (Stanley Tucker.)

Soap having incorporated therein a biguanide compound. No. 392,337. Monsanto Chemical Company. (Robert L. Sibley.)

Abrasive article comprising abrasive grains bonded by a synthetic resin containing styrene as the primary ingredient copolymerized with a substance of the group consisting of acrylic acid, alpha chloro-acrylic acid and methacrylic acid. No. 392,342. Norton Company. (Carl E. Barnes.)

Process characterized by causing a halogen (except fluorine) to react upon the compound $CH_3COCH_2CH_2CH_2Y$, in which Y is a member of the class consisting of the hydroxyl group, an amino group, the halogen and a group replaceable by a hydroxyl group. No. 392,366. Research Corporation. (Edwin R. Buchman.)

Process of making homogeneous extruded articles which have a basis of polyvinyl alcohol containing a predetermined amount of solvent. No. 392,367. Resistoflex Corp. (Ernst Schnabel.)

Process of separating components of relatively high detergent and emulsifying properties from an oil-soluble substantially oil-free mixture of sulfuric compounds having varying detergent and emulsifying properties and solubilities in hydrocarbon oils. No. 392,371. Standard Oil Development Company. (Edmond R. P. E. Retalliau.)

Method comprising pyrolizing propylene chloride at a temperature above 450° C. but below that at which excessive carbonization occurs and thereafter isolating allyl chloride from the reacted mixture. No. 392,372. Shell Development Company. (Herbert P. A. Groll.)

Bleaching wood pulp by treating in aqueous suspension with bleach solution at pH from 8.3 to 10, and when bleaching is substantially completed increasing the alkalinity of the mixture to effect dissolution of oxidized impurities. No. 392,374. The Solvay Process Company. (John Schuber.)

Mixture of substance selected from group consisting of cholestenone sulfonic acid and its water-soluble salts, a material difficultly soluble in water, and water. No. 392,387. Winthrop Chemical Co., Inc. (Adolph Windaus.)

Process for separation of mineral mixtures having grains at least 3 mm. in diameter. No. 392,395. Metallgesellschaft A. G. (Ernst Bierbrauer.)

Foreign Chemical Patents

Canadian and English—p. 43

Granted and Published November 12, 1940.

Method of preparing esters of alcohols containing at least eight carbon atoms and sulfo-carboxylic acids containing less than eight carbon atoms, the hydrogen of the sulfonic group of which is replaced by an organic nitrogenous base. No. 392,405. Frank J. Cahn and Morris B. Katzman.

Producing chlorine by oxidation of hydrogen chloride over a heated catalyst containing a copper compound and a compound of a metal selected from uranium and the metals of the rare earth group. No. 392,437. Air Reduction Company, Inc. (Hoke S. Miller.)

Alkali electrolytic bath for anodic treatment of clean surfaces of aluminum and its alloys, which contains about 1% to 2% of an ammonium salt. No. 392,443. The British Aluminum Company Limited. (Alfred N. D. Pullen.)

Ethers containing monobenzyl-para-aminophenol in amounts sufficient to prevent deterioration. No. 392,458. Carbide and Carbon Chemicals Limited. (Ellis T. Crawford, Jr., and Rodolphus K. Turner.)

Method of digesting fibrous material. No. 392,459. Chemipulp Process, Inc. (Thomas L. Dunbar.)

Method and apparatus for the separation of solid particles from fluid. No. 392,461. Consolidated Paper Corporation Limited. (Horace Freeman.)

Solution for producing water-resistant compounds composed of zein, an aqueous alcohol solvent of zein, a wax and a hydrocarbon solvent of the wax. No. 392,462. Corn Products Refining Company. (Collins Veatch.)

Preparing metallic soap by reacting under substantially anhydrous condition a halide of a metal of sub-group A, group IV, with a high molecular weight monobasic organic acid at moderately elevated temperatures, sufficient to form a soap of said metal and to eliminate hydrogen halide by volatilization. No. 392,483. National Lead Company. (Walter W. Plechner.)

Manufacture of salts of styphnic acid by the sulfonation and nitration of resorcine to styphnic acid and the subsequent formation of a crystalline salt therefrom. No. 392,487. Remington Arms Co., Inc. (Willi Brun.)

Method of producing metals and alloys by aluminothermic reduction of metal oxides which comprises replacing a minor but substantial proportion of the aluminum in the smelting charge with carbonaceous material sufficient to produce a steady boiling effect in the said smelting charge throughout the aluminothermic reduction. No. 392,507. United States Vanadium Corporation. (Otto H. Lorange.)

Two-stage hydrogenation process. No. 392,508. Universal Oil Products Company. (Robert Pyzel.)

Manufacture of aminosulfonic acid amide compounds on the benzene series by acylating the amino group of a para- aminobenzenesulfonic acid amide by a hydroxyacyl or an aminoacyl radical which radicals may be substituted in the hydroxy or amino group by alkyl, aralkyl, cycloalkyl, aryl or acyl groups. No. 392,511. Winthrop Chemical Co., Inc. (Fritz Mietzsh, Joseph Klarer and Robert Behnisch.)

4-aminobenzene-sulfonamide. No. 392,512. Winthrop Chemical Co., Inc. (Fritz Mietzsh, Joseph Klarer and Robert Behnisch.)

Manufacturing thioformamide compounds by reacting upon an amine containing at least one hydrogen atom in the amino-group with thioformamide. No. 392,513. Winthrop Chemical Co., Inc. (Kurt Westphal and Hans Andersag.)

Polymerization product of ethylene oxide having B. P. above about 80° C. and having molecular weight between 400 and 4600. No. 392,519. Camille Dreyfus. (Joseph Bludworth.)

Producing pure sodium cyanide from ammoniacal aqueous solutions of sodium cyanide by separating sodium cyanide containing water of crystallization from the solution by removal of ammonia and then recovering the solid cyanide from the mother liquor. No. 392,523. Reinhold Fick and Karl Wintersberger.

Process for preparing hides. No.392,525. Otto Röhm.

Granted and Published November 19, 1940.

Metal surface treating method causing iron chloride to form on a ferrous body. No. 392,529. John C. Redmond and Ralph W. Hodil.

Process for preparing lead alloys containing bismuth and tin. No. 392,544. Nettie May Hurd-Bullock.

Synthetic skating surface consisting of a plastic composed of a mixture of naphthalene, gum dammar and carnauba wax with a suitable lubricant. No. 392,550. Andrew S. McBride.

Method of producing a colored photographic image in a gelatino silver halide emulsion layer. No. 392,582. Canadian Kodak Co., Ltd. (Karl Schinzel).

Production of chlorhydrin sulfonic acid by treating allyl chloride with a liquid SO_2 solution of SO_3, removing the SO_2, diluting with water and boiling the water solution. No. 392,595. Colgate-Palmolive-Peet Co. (John Ross).

Reduction of chromium chlorides to chromium. No. 392,603. The Dow Chemical Co. (Charles G. Maier).

Color-forming photographic developer. No. 392,608. General Aniline & Film Corp. (Wilhelm Schneider and Hans Loleit).

Method and apparatus for acid-treating wells. No. 392,613. Halliburton Oil Well Cementing Co. (Paul L. Menaul).

Anodic cleaning process. No. 392,620. The Meaker Co. (Ernest H. Lyons, Jr.).

Segmental pulpstone. No. 392,624. Norton Co. (Thure Larsson).

Grinding wheel comprising diamonds bonded with resins. No. 392,625. Norton Co. (Edward Van der Pyl).

Grinding wheel consisting of abrasive grain bonded with an alkyl resin bond comprising a polyhydric alcohol and an acid at least 20% of which consists of the group consisting of maleic acid and its anhydride and fumaric acid. No. 392,626. Norton Co. (Samuel S. Kistler and Carl E. Barnes).

Segmental abrasive wheel. No. 392,627. Norton Co. (Hugo W. H. Beth).

Starch manufacturing and packing process. No. 392,637. St. Lawrence Starch Co., Ltd. (William T. Gray).

Motor fuel comprising a major proportion of gasoline and a minor but substantial proportion of isopropylether, to which has been added about 0.5% of methanol. No. 392,642. Standard Oil Development Co. (Garland H. B. Davis and Robert P. Russell).

Manufacture of polyvalent metal soap from water solution of an alkali soap. No. 392,646. Texaco Development Co. (Charles C. Towne).

Process for the coloration with azo dyestuffs of mixed textile materials containing organic derivatives of cellulose and cellulosic filaments. No. 392,661. Henry Dreyfus (George H. Ellis and Charles F. Topham).

Production of leuco 1:4 di-(mono-substituted-amino)-anthraquinones. No. 392,662. Henry Dreyfus (Henry C. Olpin and Charles F. Topham).

Process for the production of a leuco 1-amino-4-hydroxy-anthraquinone. No. 392,663. Henry Dreyfus (Henry C. Olpin).

Process for the production of fabrics exhibiting colored effects. No. 392,664. Henry Dreyfus (Henry C. Olpin and George H. Ellis).

Process for the coloration of textile materials having a basis of organic esters of cellulose. No. 392,665. Henry Dreyfus (Robert W. Moncrieff and Albert W. M. Cooke).

Process for the production from at least two types of cellulosic yarns having different affinities for cotton dyestuffs of textile products capable of being dyed a solid shade with said dyestuffs. No. 392,666. Henry Dreyfus (George H. Ellis and Robert W. Moncrieff).

Process for stretching yarns, foils and similar materials having a basis of cellulose acetate. No. 392,667. Henry Dreyfus (Robert W. Moncrieff and Frank Brentnall Hill).

Apparatus for the manufacture of thin rubber articles. No. 392,669. Frank B. Killian & Co. (Fred L. Killian).

Condensing naphthalene and a halogenated nitrile of a lower fatty acid in the presencec of anhydrous ferric chloride at temperature of about 165-185° C. No. 392,673. Merck & Co., Inc. (John Weijlard and William H. Engels).

Halogenated naphthindenone containing up to 4 halogen atoms. No. 392,677. Karl Koeberle, Werner Rohland and Christian Steigerwald.

Acetal compounds of the formula aryl.X.alkyl.OH wherein X stands for a member of the group consisting of O and S. No. 392,678. Kurt Desamari and Reinhard Hebermehl.

Process for the production of copper phthalocyanine dyestuffs. No. 392,679. Willy Braun and Karl Koeberle.

Producing wrapping material by incorporating in a sheet material permeable to ultra-violet rays a 1.3.5-triazine derivative at most slightly colored. No. 392,680. John Eggert and Bruno Wendt.

Producing alkylene sulfides by causing an alkylene oxide to react with a thiourea compound. No. 392,681. Karl Dachlauer and Lothar Jackel.

Isocyclic compounds of capillary activity. Nos. 392,682 and 392,683. Gerhard Balle and Karl Horst.

Manufacturing imidazolines containing at least 10 carbon atoms. No. 392,684. Edmund Waldmann and August Chwala.

High molecular organic compounds. No. 392,685. Karl Koeberle and Otto Schlichting.

Abietinylamino-anthrapyrimidine. No. 392,686. Karl Koeberle and Otto Schlichting.

Producing quaternary ammonium compounds by reacting an alkylene oxide under superatmospheric pressure with a salt of a nitrogenous base. No. 392,687. Heinrich Ulrich and Ernst Ploetz.

A solution containing a detergent, a water-soluble salt of a polymeric carboxylic acid and a water-soluble unit of a phosphoric acid. No. 392,688. Karl Pauser and Georg Schulz.

Crotonaldehyde condensation product. No. 392,692. Karl Hamann.

Apparatus for chromium plating the internal faces of hollow articles. No. 392,693. Wilhelm Krell.

Producing nitrogenous products by condensing a polymeric alkylene imine with a compound selected from the group of aldehydes and ketones. No. 392,695. Heinrich Ulrich.

ENGLISH COMPLETE SPECIFICATIONS

Accepted and Published August 14, 1940.

Treatment of china or other clays or clay substances for the removal of objectionable coloring matter contained therein. No. 524,074. Goonvean & Rostowrack China Clay Co., Ltd.

Process for the manufacture of silica gel. No. 524,142. Anglo-Iranian Oil Co., Ltd.

Production of hydroxy carboxylic esters. No. 524,086. Consortium fur Elektrochemische Industrie Ges.

Photographic emulsions suitable for producing direct positives. No. 524,087. Kodak, Ltd.

Manufacture of artificial fibres from protein material. No. 524,090. Imperial Chemical Industries, Ltd.

Moisture proofing. No. 524,108. Wingfoot Corporation.

Preparation of isophorones. No. 524,151. Rohm & Haas Co.

Magnesium alloy. No. 524,113. T. F. Bradbury.

Color photographic materials. No. 524,154. Kodak, Ltd.

Heat treatment of hydrocarbon residues. No. 524,116. Hoedry Process Corporation.

Treatment of aryl substituted olefines. No. 524,156. Distillers Co., Ltd.

Setting of wet films of film-forming compositions such as printing inks. No. 524,121. Interchemical Corporation.

Therapeutic preparations and process for making them. No. 524,125. R. Beutner.

Process for the manufacture of soluble dry products containing a concentrated extract of tea, maté, medicinal herb-tea, cocoa, chicory, coffee, substitutes, and other similar products containing highly volatile aromatic substances. No. 524,158. Société Suisse-Americaine d'Etudes et d'Expansion Industrielle.

Methods of preserving intestines. No. 524,161. F. W. Jaeger.

Manufacture of gelatinous blasting explosives. No. 524,162. Imperial Chemical Industries, Ltd.

Oxidation of unsaturated fatty acids. No. 524,163. E. I. du Pont de Nemours & Co.

Preparation of uscharidin. No. 524,132. E. Boehringer *et al.*

Production of a nutrient or medicinal liquid from fresh grasses, clover, or like herbage. No. 524,137. F. Zunker.

Production of beryllium compounds free from fluorine. No. 524,171. I. G. Farbenindustrie A.G.

Methods and apparatus for equalizing the variations in pressure of gases at high temperature. No. 524,186. Holzwarth-Gasturbinen A.G.

Apparatus for degasifying oil. No. 524,209. Callender's Cable & Construction Co., Ltd.

Method of protecting alkali cyanide crystals. No. 524,211. J. H. Schmitt.

Process for the manufacture of artificial asbestos. No. 524,214. W. Ludke.

Anti-halation layers for photographic material. No. 524,217. Du Pont Film Manufacturing Corporation.

Production of beryllium compounds free from fluorine. No. 524,321. I. G. Farbenindustrie A.G.

Additional English Complete Specifications accepted and published Aug. 14, 1940, will be digested next month.

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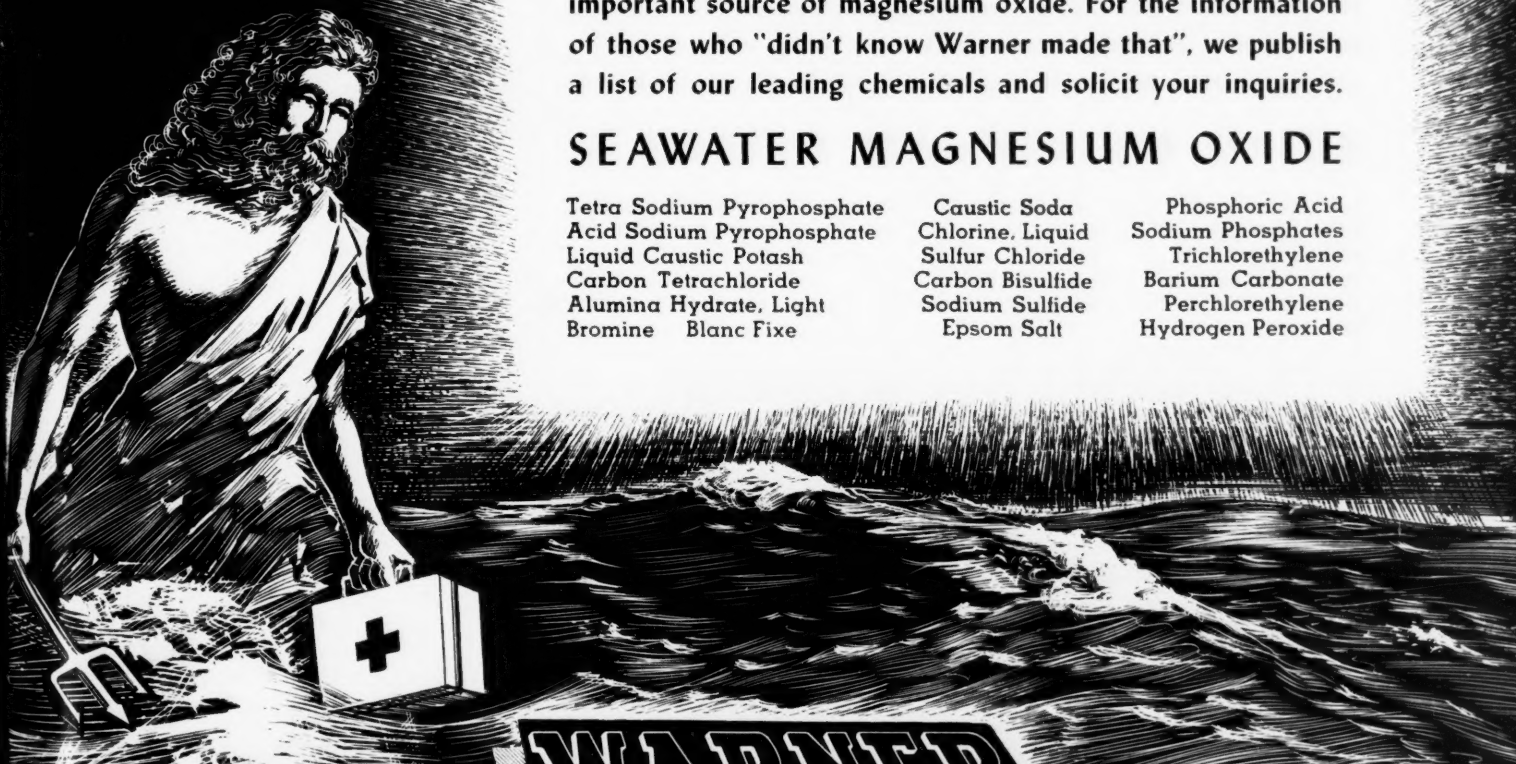
Carbon Tetrachloride	Carbon Bisulfide	Barium Carbonate
Alumina Hydrate, Light	Sodium Sulfide	Perchlorethylene
Bromine Blanc Fixe	Epsom Salt	Hydrogen Peroxide



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